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CHHAYA GOEL HIGHER EDUCATION — SOME OBSERVATIONS
M.R. KURUP MAHARASHTRA UNIVERSITIES ACT 1994
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INDIA SAROJ PANDEY TEACHERS FOR THE TWENTY
FIRST CENTURY VANDANA MEHRA & SUNITA SANGWAN
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Editor :
SUTINDER SINGH

Higher Education Some Observations

Chhaya Goel*

Pick, Place and Promotion Criteria

There is a need to perfect the recruitment, placement and promotion criteria for the higher education teachers. Comprehensive and upto date databases need to be created which may facilitate objective management by applying the criteria through Relational DataBase Management System. Also, there should be scientific system design considerations, such as, whether the recruitment should be centralised or decentralised. In this age of resource crunch how the administration, management, and governance can be made democratically more appealing is a big question. How to induct intelligence in the interview boards to differentiate between 99th and 98th percentiles? Can it be realised through NETs and SETs? Can it be realised through the open presentations? Can it be realised through the Interview Boards? What should be the mechanisms for constituting the Expert Interview Boards? Running randomizer across a comprehensive list of experts may yield better results. There seems to be a continuous quarrel between subjectivity and objectivity. If man could not remain bias free then there is every possibility that machine may govern man. Artificial Intelligence may govern Real Intelligence.

Communication & Communicology

Teachers need to be communicators and communicologists. They should be skilled in using different methods, media and modes appropriately. Related to this are the problems of class-size, learning resources and medium of instruction. What is the role of a university teacher when the class size is zero on the one hand and when the class size is more than hundred on the other? How to solve the problem of specified medium of instruction and multilingual class? How to have access to learning resources, manage learning resources and develop learning resources? How the resources can be utilised optimally, co-operatively? Suitable pedagogy needs to be developed for varying sizes and settings. Teachers should be in a position to enculturate, acculturate and transcreate. They should be in a position to operate from local perspective to global perspective, personalised instruction to mass instruction, from local class to countrywide class, and from continental class to global class.

Autonomy and Accreditation

Some of the organisations are facing the problem of autonomy and accreditation. Usually, the new courses and degree programmes designed and proposed by the higher education teachers have to be approved by the respective Board of Studies, Faculties and the Syndicate or the Executive Body of the universities. Some of these courses need accreditation by related apex agencies. If a need based new programme is proposed which is different from the usual courses offered then it should be within the perview of such agencies. If it cannot be examined by a single agency then there should be networking amongst the

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different agencies. Should we have pre-plantation accreditation or post-accreditation after the utility of a programme is established at the implementation level, or both? What are the difficulties in the preaccreditation? What are the risks in the post-accreditation?

Microspecialisation, Interdisciplinarity & Multidisciplinarity

Progressively there is a shift from microspecialisation to interdisciplinarity and multidisciplinarity. Some interdisciplinary departments, such as, Bio-Chemistry, Bio-Physics, Micro-Biology, Bio-Technology have emerged and established over the years. If a course on Environmental Education, Health Education, Special Education and Computer Education etc is offered by a Department of Education for teacher education purposes then the doubts are poured in the form of a question, that, do you have a competent faculty to offer these courses and programmes. More than the question of a single competent faculty, it is the problem of sharing of material and human resources amongst the various departments of a Faculty and amongst various Faculties. A discipline like Music has to cut across many disciplines, such as, Audiototechnology, Engineering, Mathematics, Physics, Architectural Acoustics, Perception Cognition, Neuro Science, Psychoacoustics, Speech Science, Hearing Science and Computer Science etc. How to realise this interdisciplinarity? Similarly the concept of multidisciplinarity at the university level, wherein, students from one Faculty opt for some courses from other faculties, students of one university opt for courses offered by some other universities, students of conventional universities opt for courses offered by the open universities are still in embryo and infancy. To begin with there should be networking between University-University, University-Industry, Medium-Medium etc to realise the ultimate goal of internetting.

Teaching, Research, Development, Extension and Consultancy

A higher education professional needs to involve himself in teaching, research, development, extension and consultancy. Unending debate has been going on how much time should be devoted to these various roles. It cannot be worked out mechanically. Yet an equation can be realised between teaching profession and all the related roles. Imbalances are observed with respect to contribution of the teachers in these areas. Some teachers have been found focusing on teaching mainly, others on research. Some are found very often off campus busy with consultancy

and extension. Rules vary with respect to self-supportive programmes, consultancy and extension.

Rules for Ph.D. registration vary from university to university, such as, percentage score obtained at the P.G. level, interdisciplinarity, structure of Research and Degree Committees, on campus stay by the researcher, change of title of the study, extension period for the Ph.D. work and evaluation of Ph.D. thesis report. Similarly, the rules for becoming Ph.D. guide vary from university to university.

Administration, Governance, Development & Finance

Higher education teachers should have adequate knowledge of Constitutional Organisational Structure of the University in terms of its Act, Statutes, Ordinances, Rules, Resolutions of the Syndicate or Executive Body. Also, they should be fully aware of the Institutional Organisational Structure — Senate, Syndicate, PG Council, Faculties, Board of Studies and its functioning.

They should have adequate knowledge regarding university maintenance and development. They should have adequate information regarding the roles of the related agencies, such as, CSIR, DST, AICTE, MHRD, UGC, NCTE, ICSSR, AIU. They should have adequate knowledge of Plan Grant through five year plans and Non-Plan Grant in the form of DRS, DSA, CAS, COSIST and COHSSIP. Also they should be aware of unassigned grant in the form of non-plan yearly grant for travelling abroad, travelling within India, exchange of teachers, seminar and conferences and research schemes.

Every higher education teacher needs to have adequate knowledge of University Finance and Personal Finance. How concurrence of the state government is required with respect to plan expenditure. How to strike a balance between receipt and payment? How the Service Book should be maintained.

The university teachers should not only be aware of the University Act they serve but also need to be well informed regarding the rules and regulations of affiliating universities, unitary or residential universities, professional/vocational universities, deemed universities and open universities. There needs to be correspondence amongst the Acts, Statutes, Ordinances, Rules and Articles of the different universities. The teachers need to be very sensitive to the anomalies with respect to the service conditions existing in the different universities, such as, how the period of service rendered in a particular State in India does not count towards the Service Benefits in

the other states. How the ordinances with respect to the same programme differ from college to college and university to university? What about the further studies and employment of the product of a university who has to move on to the other universities? Some of the universities have Grading system of evaluation, whereas, others have Marking system. How to have interconversion from one system to the other? Some of the universities are finding it extremely difficult to interpret the grades in terms of equivalent marks. Inducting partly external evaluation system in total internal evaluation system may not ensure quality control. Such decisions should be taken by highly competent bodies.

Technology in Higher Education

Technology in higher education is either under utilised or not utilised. Though we have a high quality Country Wide Class Room Programme for undergraduate students, a large majority of the students are not even aware of it. Though computers are being utilised in different walks of life education has not yet been in a position to utilise this medium to the desired extent. Rarely universities in India have access to Internet. The higher education bodies should not only download the network but also upload it meaningfully.

Teaching at the university level should enhance departments into skill centres, remedial centres and enrichment centres. Rather than competitive learning there should be cooperative learning. There should be positive interdependence and face to face helping interaction. There should be team assisted individualisation and computer assisted co-operative learning.

All the staff and students should have working knowledge of computers. Computers have revolutionised the working environment and research environment. But there is a problem of resource crunch in higher education. There should be sharing of resources. Wherever necessary the sharing of resources amongst different departments and Faculties of a university can be formalised. There should be more and more Inter University Consortiums. Every Teacher of higher education should be a member of related bodies.

Teacher Appraisal

What should be the criteria for teacher appraisal? It seems self appraisal is the best appraisal against laid down criteria. Some comprehensive criteria have to be evolved for objective appraisal. Should the appraisal be done by students? Should the appraisal be done by the colleagues? Should the appraisal be done

by the administrators? There is no end to debate on these unless we realise professional sensitivity.

Inservice Orientation Courses

To meet the need of orienting higher education teachers 48 Academic Staff Colleges have been planted all over the country. But these 48 ASCs are not adequate to cater to the orientation needs, of about 3 lakh teachers drawn from 166 universities (state and central), 41 institutions deemed as universities, and about 9278 colleges. Also the Diploma in Higher Education offered by IGNOU has been considered equivalent to two Refresher Courses. The present infrastructure for meeting the requirement of one orientation course and two refresher courses as a partial requirement for promotion to the senior scale is inadequate. Also, there is a need to re-examine the in-service teacher orientation curricula.

Poverty in Learning to Meta-Cognition and Creation

Higher education needs to maintain and develop its identity. Poverty in learning that too at higher education level cannot be relished. All efforts should be put by a university to realise meta-cognition. Alongwith consumption there should be creative production.

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Maharashtra Universities Act 1994

A Few Suggestions for Amendment

M.R. Kurup*

The University is the only hope for a nation to progress and keep pace with other growing nations. It is a place where issues—social, political, scientific, technical, philosophical, or economic—pertaining to today and tomorrow are deliberated and recommended to those at the helm of affairs of the nation. It is time to unlock the universities so as to provoke thinking and make the process dynamic. It would have been better had the universities been left to themselves through self-regulations, instead of creating bottlenecks and barriers against academic innovation and experimentation. Any university Act ought to be an instrument to facilitate the university leadership to attain the goals of higher education in a developing society. The Act therefore should be adequately flexible and largely promotional than regulatory. The common Act of 1994, replacing university-wise Act, governing all non-agricultural universities in Maharashtra is anything but progressive. It is rigid to the core and comprehensively restrictive, leaving hardly any room for the academic leadership to face challenges thrown open by the times. The Act has brought the Vice-Chancellor and the principals of colleges under the thumb of the government, resulting in degeneration of the campus. The academic leaders have been reduced to mere, and often poor, administrators. Higher education therefore will cease to provide the critical cutting edge, essential for accelerating socio-economic transformation of the country. In the context of globalization of the economy and the mind-set of the middle-class, a static university with outdated syllabi, will produce graduates who are ill-equipped, frustrated and pessimistic. A few rupees saved for the Exchequer, by a strict implementation of the Act, will turn out to be costly for the nation in the long-run. Now that the Chancellor of the universities has directed a fresh look at the Act, the academic leadership should come forward to resolve the lacunae in the Act. This paper, which deals with amendment of certain specific Clauses, is an attempt to initiate a discussion.

Section 2 deals with definitions. Principal of the college and part-time lecturers have not been defined as 'Teacher', resulting in functional complications. The erstwhile Act of 1974 had provision to define

them as Teachers, and they were so defined. Since the Statutes of the university define the Principal as "non-vacation", the new Act should have defined Principal accordingly as "non-vacation academic staff", like the Librarian, and resolved all sorts of complications, particularly relating to earned leave and the provision for encashment.

Section 5 deals with powers of the affiliating university. The university has the power to rescind affiliation and also to recommend to the government the take over of the management of erring colleges. These are too drastic actions, affecting the students and the staff more than the management. Such actions may be considered only as a last resort. It is necessary to provide for minor punishment, so that the management will not escape from their undoings. Non-adherence of directions of the Vice-Chancellor, Statutes, Ordinance and the Act should be dealt with initially as minor and persistently as major. Similarly, the university has the power to evaluate the performance of its own departments and colleges, but there is no provision in the Act for taking any action against non-performance.

Section 8, which deals with the control by the government, is the most draconian among all clauses and could have been avoided, or made simple and flexible to protect the academic autonomy of the university. This Section has enabled the government to virtually take over the control of the universities. It has not spared even the basic function of updating, innovating and restructuring of the content of education—syllabi and the technology of teaching and learning. It is sad to see Administrative Officers and Joint Directors disowning the academic decisions of the university with a vengeance and over-ruling the Hon'ble Vice-Chancellor. The university bodies like Senate, Academic Council and the Management Council are democratic sub-systems, specialized in academic-administrative decision making, and are, therefore, better equipped to deal with such matters than any other democratic/legislative bodies. The preventive clause in the Act, that "University shall not do..." is unfortunate and is an expression of a total lack of faith in subsystems, which are specially created to take such decisions. It would be democratically just and legitimate to allow universities to function as autonomous bodies to ensure "excellence, ef-

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efficiency and equity", through timely academic initiatives. Before implementation of the schemes, the rationale of the change is communicated to the government for information. Usually all decisions of the Academic Council are unanimous, with government representatives present. Hence, the government should look at the academic decisions of the university as desirable symptoms of progress and accord sanction. Under no circumstance should the government veto the process of restructuring and updating of the course contents by the universities and autonomous colleges. This is particularly so as the government is represented in all these bodies of the university at the level of the Secretary, Director or at least the Joint Director. As such decisions of the bodies of the university, which have ex-officio nominees from the government, should be binding on the government. The Senate and the Management Council have even the Chancellor's nominee. No prior sanction of the government be needed when the decisions are unanimous. If such decisions with direct or indirect financial implications are not binding on the government, there is no reason for the nominees of the Chancellor and the government to be made ex-officio members of the university bodies. Government should restore autonomy to the university, and wherever prior permission of the government is insisted on, a time limit for such response should also be stipulated.

Section 13 deals with the tenure of the Pro-Vice-Chancellor. It says that the tenure of the Pro-Vice-Chancellor is co-terminus with that of the Vice-Chancellor. This is likely to create a leadership vacuum in the university, particularly when a Vice-Chancellor relinquishes office all of a sudden, for whatever reason. It is essential for the Pro-Vice-Chancellor to continue till a new Vice-Chancellor assumes office.

Section 14 states that the VC shall place the directions issued before the relevant authorities, at the earliest opportunity. This term "earliest" has not been stipulated, and as such, many a Vice-Chancellor is found not placing, at times deliberately, inconvenient directions for months if not years at the meeting of the respective body to avoid criticism.

As per *Section 15*, Deans are Academic Officers of the university and have been assigned a wide range of duties and responsibilities. However, they are full-time teachers in colleges or the university. Due to preoccupation in the university administration, some of them may find it difficult to give full justice to their college work, or vice versa. Therefore, in case of major Faculties like Arts, Science and Com-

merce, the Dean should be a full-time academic officer of the university, on deputation from their respective colleges, like the Director of Students Welfare.

Sections 25 to 29 deal with composition of different bodies of the university. The representation of the Principals and management of colleges have been drastically reduced in the Senate, Management Council and Academic Council. Even if there is a case for pruning the size of unwieldy bodies, the axe should not have fallen on the Principals, who constitute the pivot in the affiliating system of university. They are the persons who implement the decisions of the university. They are the persons who implement the decisions of the university in the colleges, and are in a better position to educate the university administration on all matters connected with higher education. The reduction ought to have been proportionate vis-à-vis other segments in the respective bodies. Certain sections, which do not have any primary role to play in the academic administration, except for providing socio-political feedback, could have been pruned instead of Principals and teachers. As per the 1974 Act, one-third of Principals of the affiliated colleges were represented on the Senate. This is reduced to mere 15 out of the present strength of 90. The Act needs to be amended to restore parity in the representation of Principals in Senate, Management Council and Academic Council, at the earliest. While restoring parity, the system of election be replaced by a system of election-cum-rotation. Similarly, *Section 27(1) (n)* which is discriminatory, needs to be amended to enable any member of the Academic Council to be eligible to be nominated to the Management Council.

Sections 31/32, which deal with the Board of Examinations, should be modified to exclude the Board from conducting and regulating the examinations in autonomous colleges, institutions and university departments. This is against the basic principle of autonomy. Similarly, internal and the "Allowed To Keep Terms" (ATKT) examinations in colleges should also be left with the institutions concerned. This will give room for the university to concentrate on the effective management and qualitative improvement of the final year examination, which is largely the basis of the degree awarded by the university. The Controller of Examinations, who will directly report to the Vice-Chancellor, should have high academic qualifications, as those prescribed for direct recruitment of Registrar, with 8 to 10 years of academic administrative experience, including the conduct of examinations.

The universities have not so far succeeded in implementing *Section 35*, which is concerned with the Board of College and University Development. Not even a third of the colleges in Maharashtra are listed under *Sec. 2(f)* and *12B* of the UGC Act, depriving them of development assistance from central government agencies. This is largely due to lack of monitoring the progress of colleges by the University. The Board should be proactive and assume the role of an active catalyst to ensure academic progress and infrastructural development, particularly fulfilment of affiliation conditions. The Board should meet once a month to cut out delays and carry out the functions listed in the Act.

Section 37, which deals with Board of Studies, should be amended to give effect to the stay granted by the Bombay High Court, and that the Principals be made eligible to become members of Board of Studies, Faculty, Dean etc, as under the 1974 Act. The Principals may be recognized as the Head of the Department, wherever they are so designated, for the purpose of this Act.

There is no reason why Principal be designated as the Chairman of the Student Council, as provided for in *Section 40*. He should always remain as an appellate authority in the college and should not hold chairmanship of any committee in the college, except notional. Alternatively, one of the teachers may be designated as the Vice-Chairman. Wherever there is no Director of Sports, the Chairman or Professor in Charge of Gymkhana may be made a member of the Council. Similarly, instead of two lady students, the Principal may be allowed to nominate two students, male or female, depending on the overall composition of the Council, to represent less represented segments. It would be ideal to have mixed system of representation — 50% on academic merit and 50% of extracurricular merit, for which standard norms could be laid down.

Section 50 is a welcome step. It is necessary to lay down procedures to be followed for the smooth functioning of the committee. A time limit may have to be stipulated for acceptance of nomination under *Section 50*. Read with *Section 48*, it is essential to stipulate whether the nomination lapses automatically within a period of say, 30 days, or three consecutive meetings of the said authority. It would also be good if an explanation is provided in case of "casual" vacancies, which come under the purview of *Section 50*. These will prevent unwarranted litigations and wranglings.

With respect to *Sections 52 to 55* a time limit

should have been stipulated for framing of Statutes and Ordinances. They are not yet ready, though the Act has come into being in 1994. It is also essential to provide for minor penalties for misuse of Statutes, Ordinances and the Act by the university and colleges, as discussed *vide Sec. 5 supra*. Time limit may have to be prescribed for formulation of all relevant Statutes, Ordinances etc consistent with the Act of 1994.

Section 56, which deals with State Council for Higher Education, has not so far been implemented. The Council, with over 50 members, mostly ex-officio, is too unwieldy. It should be a professional and autonomous body, rather than a purely government outfit. The Minister of Higher Education may be the Chairperson, with Secretaries to the Chancellor and the Departments of Higher Education, Youth Welfare and Finance as ex-officio members. The Director of Higher Education may function as the Secretary of the Council. There should be larger representation to Principals on the Council, against a mere two at present. The decision of the Council shall be binding on the government and the universities. The Council should be the apex body at the State level, for policy planning and implementation. It should liaise, coordinate, collaborate with inter-state, intra-state and international agencies and institutions for curriculum development, funding, research & development projects etc. It should have the power to raise and disburse development finance, including setting up and management of Higher Education Finance Corporation, in the line of a development Bank.

Section 57 relating to the Grievances Committee in the university, has a flaw. The members of the Committee are exclusively drawn from the Management Council (MC) of the university. The report of the Committee goes to the MC for acceptance and thereafter for implementation. The MC is likely to be influenced by the members of the Grievances Committee who are present at the time the MC considers the report. It would have been ideal to have a Grievances Committee composed of knowledgeable people drawn from AC, Senate and a nominee each of the Teaching and Non-teaching Staff Union, with Pro-Vice-Chancellor and the Registrar as the Chairman and the Secretary respectively. When the report comes to the MC for final consideration, all members are fresh and unbiased. Here MC also works as an Appellate body.

Sections 62-65 dealing with Tribunals, should be modified to provide for an appeal to the High Court against the decision of the Tribunal. There should be

no bar on legal practitioners from practicing, since cases may entail interpretation of rules and points of law. It should be made mandatory for the Tribunal to dispose off the cases within three months, and under no circumstance, a case should be pending for more than six months. The Admission Tribunal shall come into force only after the rules relating to such admissions are clearly and unambiguously formulated. Issues like interest of private management, constitutional protection, reservation policy, integrated nature of +2 and +3 sections in the same institution etc, should be clearly sorted out. The rules shall be published throughout the state, before empowering the Tribunals for mediation. Provision should also be made to empower the Principal to refuse a certain admission, if in his opinion, such an admission is likely to disturb the tone of overall discipline in the college.

The scope of Section 72, dealing with time limit for declaration of examination results, should be extended to cover the results of revaluation and verification. The Act should have defined examination work as mandatory work for all teaching and non-teaching staff of colleges and the university departments.

Sections 81-82 dealing with affiliation, should prescribe minor penal action against the management of colleges which do not fulfil conditions of affiliation within a reasonable period of time, as discussed *supra*. There are large number of colleges which ignore the conditions laid down by the university for continuation and extension of affiliation. They prefer to remain temporarily affiliated even though every college is eligible to seek permanent affiliation after six years of standing. The faculty and students are at a great loss if the college does not receive UGC assistance.

Section 85 needs modification. The Local Managing Committee (LMC) should have odd number, instead of even. This may be done by retaining the representation of teachers same as before, or by adding one more representation to the management. At least one of the teachers should be a Head of Department with some administrative experience, to enable the Principal to delegate such work to him, wherever necessary. Alternatively, the Principal shall have the right to co-opt one of the teachers belonging to the departments of Accountancy, Commerce, Economics or Management, who is familiar with finance, budgeting, administration. A teacher member of the LMC, who has been so empowered through delegation, shall be recognized by the University to act for

and on behalf of the Principal, including officiating whenever the principal is absent. The present system of appointing the senior most teacher as In Charge Principal may be discontinued, since what needed is the administrative exposure and knowledge, than mere seniority. There is a need for making the functions of LMC specific and those which overlap with those of the Governing Body of the college or other regular faculty committees, be deleted to avoid duplication, confusion and conflict. Empowering the employee is ideal, but empowering without accountability may, some times, lead to disastrous consequences on day to day administration. It is therefore, necessary to lay down an "accountability clause for the membership of LMC.

Sections 88, 89 which deal with permanent affiliation and autonomy, should be amended to list basic conditions for permanent affiliation. It should also incorporate a mandatory clause for bringing the college under permanent affiliation fulfilling the basic conditions of affiliation, within a certain minimum period, say 12 years, which is twice the number of years prescribed for the college to get permanent affiliation. Similarly the university be given the authority to confer "autonomy" on any college also *suo motu* based on the sound financial position, consistent administrative and academic excellence, quality infrastructure and the teaching staff. Autonomy could be conferred initially for a block period of five years, renewable depending upon performance appraisal.

Section 111, which justifies actions not strictly in accordance with the provisions of the Act, including those which are high-handed and irregular, has been misused in many a university. Therefore it should be deleted from the Act.

Since there were differences among the independent Acts of each of the universities, a provision should have been made in the common Act, allowing the respective university to issue directions or ordinances, to sort out anomalies and transitional problems. The Act should have also listed the role and responsibilities of management of private colleges, besides providing for certain incentives for performance. Finally, the Act should have made an attempt to resolve the jurisdictional conflicts between university and all-India professional bodies like IMC, AICTE etc. Attempt could have been made to stipulate the authority of the university to prescribe workload for teachers in the professional colleges which are acceptable to the government for grant-in-aid.

Women in Science & Technology in India

Malti Goel*

Introduction

"At the end of 20th century, it is wholly inexcusable that centers of modern academic teaching and excellence should remain bastions of male power and privilege".

That is how the report on Women at the Top, (the *Hansard Society for Parliamentary Government, London 1990*) described the women status in science & technology in U.K. The statement is true around the globe, with a few exceptions. The role and contribution of women to socio-economic development is known from the centuries, yet as we are approaching the 21st century, their share in science & technology is rather a low percentage of the total. In India the situation is no different. From an early Vedic period, when there was equal access to education for women, the transition has neither been linear nor smooth. After a long phase of severe degeneration and deterioration, renaissance made during 19th & 20th century have improved the situation only to a limited extent. It is only in the last two decades that women's role in science & technology is being recognized as a result of several important government interventions. A recent study has shown that the share of women in India in total graduate engineers in the engineering fields has increased from less than 1% in 1970 to about 10% in 1990, and more so in the recent years.

This paper discusses the social transformations that have taken place to support women education in India, growth profiles in the science & technology fields as well as the international perceptions on women participation in scientific research. Very few studies have been carried out on women in specific scientific disciplines, the findings of two such studies are noteworthy. The first study on status of women engineers in India was carried out by S.P. Sukhatme and P.P. Pareek at IIT, Bombay¹ The other report which led to a debate on increasing participation of women in science in the advanced countries, was carried out by J. Megaw, a York University physicist who collected data on women in Physics in many countries including India. From these findings follow the discussion on constraints and opportunities women face in pursuing career in Science & Technology (S&T) fields. Finally, the programmes of De-

partment of Science & Technology and ways to improve future prospects for women are also discussed.

Social Transformation and Women Education

In the first universities established in the country in the year 1857 at Calcutta, Mumbai (then Bombay) and Chennai (then Madras) by different Acts, it was only in 1877 that Calcutta University opened its door for girls. The matriculation examination was permitted for girls and this example was later followed by universities at Chennai in 1881 and at Mumbai in 1883 Indian Education Commission (1882-83) was first to make a note on extremely backward condition of female education and made a recommendation that public funds of all kinds — local, municipal and provincial should be chargeable as an equitable proportion for the support of girls' schools as well as boys' schools. These efforts led to a beginning of women participation in higher education. Further incentive for female education came through Government Resolution on Education Policy (1913). It laid emphasis on the education of women by introducing special curricula of utility for girls and suggested that importance should not be attached to examinations in the education of girls. The two major guiding factors have been—parents' desire to educate their daughters and social reforms which continued to press upon the system.

After independence, several landmark decisions have been made by the government on women education as well as improve the status of women. University Education Commission (1948-49) considered issues like helping women students and social responsibilities on part of men in mixed colleges. As a follow up to this commission, several committees were constituted by the government to review education at various levels. Among these, the Committee on Women Education (1957-59) chaired by Smt. Durga Bhai Deshmukh, was first to point out the need for encouragement to girls for taking subjects like Commerce, Engineering and other professional courses. Many constructive recommendations of this Committee, like introduction of condensed courses which train women for suitable vocation after completing the basic education and suggested employment for women on part-time basis as a policy, however, have remained unimplemented even today.

In 1964, Differentiations on Curricula for Boys and Girls Committee recommended that co-educational

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tion should be adopted as a general pattern of education at the elementary stage and stressed the introduction of sex education at the middle school level. This intervention led to appointment of women teachers in large number in secondary schools. Another important recommendation was made by Committee on Status of Women (1971-74), emphasising for the first time the economic independence of women and promoting skill oriented training for women. It also spoke of universalisation of education and free education to girls upto the secondary level.

Besides these major decisions, each of the Five Year Plans as well as the National Education Policy of 1968 have in one way or another expressed concern about women education, empowerment and training for economic activity and have led to increasing participation of women in science and technology. The Working Group on Employment of Women (1977-79) set up during formulation of Sixth Five Year Plan, created a paradigm shift in the perspective, from women welfare to development which enunciated an integrated and multi-disciplinary approach with three pronged thrust on health, education and employment. Most recent efforts in this direction is National Perspective Plan for Youth upto 2020, being prepared under the auspices of Department of Youth Affairs & Sports, Ministry of Human Resource Development (MHRD) which has highlighted gender issues and young women participation in a future scenario

Growth Profiles in Science & Technology

The Science Policy Resolution (SPR) 1958 and Technology Policy Statement (TPS), enunciated in 1983 have made no distinctions between men and women in science. Stressing on development of scientific capabilities & manpower as well as technological self reliance, these policies have been instrumental in increasing the participation of women in vocational, technical and technological education at different levels. The overall annual growth rate of S&T personnel during the period 1950 to 1990 can be quantified as more than 20% compounded growth per year^{2,3}. It is estimated that there were 61.14 lakh students enrolled in as many as 221 universities/deemed universities, with 8613 colleges in 1994-95, against 29.52 lakh students in all faculties in 132 universities and 4880 colleges in 1981-82. The number of women colleges increased from about 700 to 1100 during this period. The estimated stock of S&T personnel in the country in science & technology related disciplines was expected to be 6.3 million in 1996.

The growth profile of institutions of higher learning during 1950 to 1996 is shown in Table 1.

This growth of infrastructure in education has indirectly contributed to the increasing participation of women in science and technology. There has been remarkable growth in the number of women enrolled in the institutions of higher education from 0.04 lakhs in 1950-51 to 20.65 lakhs in 1994-95. The share of women in total enrolment in higher education has steadily increased from 11% in 1950-51 to 34% in 1994-95.⁴ Their number in S&T faculty in absolute terms has increased from 2.87 lakhs in 1986-87 to 3.59 lakhs in 1990-91 and further to 3.96 lakhs in 1992-93 (Table 2).⁵ However, subjects like Physics and Engineering had remained alien to women till early 1970s. The statewise distribution of women and men, their total enrolment in higher education in 1994-95 and the number of women engineering graduates in the years 1975 and 1990 are shown in Table 3.^{6,7}

Programmes of Department of Science & Technology

To increase women participation in research and development, Department of Science and Technology (DST) has a scheme of assistance on Science and Technology for Women aimed at promotion of research & development and adoption of technology for improving the quality of life, working conditions and opportunities for gainful employment specially in rural areas. It also aims at increasing contribution of women to science and technology and development, focusing on problems of women in different geographical regions of the country.⁸ The scheme is meant for scientific institutions, universities, registered non-governmental and voluntary organizations who plan a project work for application of science & technology to rural women.⁹ Some of the activities taken up are transfer of available technology and development of new technology for rural areas in the areas of nutrition & health, drinking water & sanitary applications, hazards & accident protection and drudgery reduction. Fellowships and reentry research programmes are being envisaged for women researchers.

A number of studies have looked into assessing the science education in the country and orientation needed to achieve higher performance in meeting the challenge of global competition in technology development. The key issue of matching of S&T human resource being trained by our education system, with the requirement of technology development in order to meet the future with greater confidence has been dealt in a TIFAC study under the auspices of

DST.¹⁰ The development of science based skills is an important part of education, anywhere. In order to keep pace with the emerging knowledge based industry of tomorrow, the management has to play an important role in technology programming for creating an innovative culture.¹¹ In spite of a steady growth in the enrolment, the share of women in such endeavours has been rather low so far.

A fact finding study on Women Engineers in India supported by Department of Science and Technology way back in 1992 was the first attempt to carry out a survey on women engineers, their status, employment pattern and concerns. The enrolment pattern showed progressively increasing participation of women engineers (Table 3). The representative figure of women engineers in 15 top institutions is shown in Table 4.⁷ For engineering and technology, there is an increase from less than 1% in 1975 to about 9% in 1988. It was estimated that stock of women engineers was about 19000 in 1990 and it was projected to become more than 50000 in 1996. Among the preferred branches, Electrical Engineering and Electronics topped. Kerala state has the largest share in percentage of women engineers followed by Karnataka and Tamil Nadu. This study also highlighted the limited career opportunities existing for women engineers in the country

International Perspectives

There is little systematic data internationally on women in science. In engineering, the first woman who obtained graduate degree globally was in 1882. However in the same year Nobel Prize winner Physicist Marie Curie was not admitted to French Academy of Science, being a woman. The data on share of women in science and technology combined disciplines and their employment performance for the recent years is shown in Table 5 for select countries.¹² This table shows low level of women participation in science and technology fields in general, and at higher positions in particular. The study by Jim Megaw¹³ is one of the few studies on international comparisons of women in specific scientific fields. The percentage share of bachelor/doctorate degree awarded to women in Physics and in total Physics faculty for a number of countries is shown in Table 6. The Megaw study showed that some of the countries like Hungary, Philippines and Turkey seem to have done well as far as women researchers are concerned; whereas the advanced countries were not so advanced in this respect. The countries undergoing economic development made up for 20 to 50% of scientific researchers, whereas industrialized countries

UK, USA & Canada have fewer women in S&T discipline—less than 5% of Physics faculty and 12% of Physics students. It is a contradictory condition for women in science. Indian situation is somewhat similar to the general situation of women in all other countries.

The reasons for greater participation of women in S&T in some of the developing countries are analyzed in terms of class structure, work ethics and system of education. Class consciousness for elite and Physics & Maths as compulsory subjects in schools, were attributed as reasons for women going more for scientific research in these countries. It was noted that low status given to basic research—it not being closely integrated into production process—in developing economies and social pressure for men to pursue a real professional career like engineering profession have also contributed to larger share of women in physics. Extended family system, availability of inexpensive household help and social welfare systems such as subsidized education and good child care are the other social factors which have been instrumental in facilitating women participation in full time scientific and technical careers.

Constraints and Opportunities

From these positive factors contributing to large participation of women in research and now in engineering, there are taboos and hindrances for women to achieve academic excellence in the professional fields, as follows .

- i) Traditionally, local societal factors prohibiting career selection in science & technology fields,
- ii) Psychological barriers and women's own preference for non academic jobs, which can be taken up on part time basis;
- iii) Lack of family support and double burden as working women, of career and home, due to long working hours in scientific fields;
- iv) Six year lag period a young women has to undergo which sometime leads to dissatisfaction in career or complete dropping out;
- v) Lack of career opportunities in the professional fields of engineering and industry,
- vi) Employers' attitude and discrimination in job assignments, and
- vii) Greater responsibility in top positions which affects social pattern.

In the field of higher education, the number of seats being taken up by girls on merits is steadily increasing, but in many cases lack of physical facilities deter the parents to encourage their daughters to take up desired options. Data in R&D statistics of the Department of Science & Technology show that women scientists constituted only 9% of R&D workforce. The employment opportunities for women need to be increased by creating awareness and attitudinal change in employers. This was done in Stockholm University, where the new appointment procedure to reduce gender parity at top level positions was introduced. Prior to the interview, an expert committee with some independent/foreign members scrutinized the merit, and this gave not much scope to unfair selection procedures. A suggestion was also made to have women members on selection committees.

A similar effort is being made under the programmes like Women in Science & Technology in Asian Region (WISTAR) In one such workshop on 'Enhancing Women's Participation in Science & Technology' organized in New Delhi during 1991-92 by National Institute of Science, Technology & Development studies through support from UNESCO, the efforts were made to motivate girls to choose science at school level by introducing role models from different scientific disciplines. From these experiences and the observations made earlier, one can say that the prospects for women in science and technology fields can be made better by taking following actions :

- Collecting, monitoring & publicizing data on S&T surveys on yearly basis;
- Promoting equal opportunity for women in scientific & technical fields,
- Sensitizing by holding seminars and workshops etc;
- Supporting plans for enhancing participation of women in scientific career even at a later stage;
- Modifying service rules in the organizations who prohibit women entry;
- Creating Awareness at the students' level about courses, at the parents level and at the teachers & employers levels for a multiplier effect; and
- Providing more seats in institutions wherever applicable and also paying attention to creation of physical facilities like hostels etc.

Table 1 : Growth of Universities & Technical Education Institutions

| Year | Universities | Engg. Colleges | Medical Colleges | Agri Colleges | Poly-technics |
|---------|--------------|----------------|------------------|---------------|---------------|
| 1950 | 27 | 58 | 33 | 33 | 53 |
| 1960 | 65 | 118 | 66 | 77 | 195 |
| 1970 | 109 | 163 | 110 | 102 | 309 |
| 1980 | 140 | 226 | 125 | 117 | 332 |
| 1985-86 | 165 | 358 | 144 | 130 | 746 |
| 1992 | 194 | 424 | 175 | 136 | 948 |
| 1995 | 221 | — | 354 | — | 1110 |

Table 2 : Facultywise Growth of Women Enrolment in Higher Education

| Faculty | 1986-87 (0000) | 1990-91 (0000) | 1994-95 (0000) |
|--------------|-------------------|-------------------|-------------------|
| Science | 231 | 289 | 319 |
| Engg. & Tech | 13 | 17 | 19 |
| Medicine | 39 | 49 | 54 |
| Others | 4 | 4 | 5 |
| Total | 287 | 359 | 396 |

Table 3 : Statewise Distribution of Women Enrolment, Total Enrolment in Higher Education in 1994-95 and Women Engineering Graduates in 1975 and 1990

| States | Total Enrolment (1994-95) | Women Enrolment (1994-95) | Women Engg (1975) | Graduates (1990) |
|----------------|------------------------------|------------------------------|----------------------|---------------------|
| A.P. | 427652 | 133907 (31.3%) | 2 | 77 |
| Delhi | 136538 | 60318 (44.2%) | 1 | 63 |
| Gujarat | 416458 | 161946 (38.9%) | 1 | 79 |
| Karnataka | 487562 | 166766 (34%) | 6 | 312 |
| Kerala | 180053 | 93545 (52%) | 13 | 264 |
| Maharashtra | 950946 | 341384 (35.9%) | 13 | 117 |
| Madhya Pradesh | 375216 | 111127 (29.6%) | 1 | 122 |
| Tamil Nadu | 416654 | 165364 (39.7%) | 3 | 423 |
| Uttar Pradesh | 847263 | 224741 (26.5%) | 2 | 38 |
| West Bengal | 354808 | 123835 (34.9%) | 4 | 33 |

Table 4 : Graduation Data of 15 Representative Engineering Educational Institutions (1975-1987)

| Year | Total Number of Graduates | Women Graduates | Percentages |
|------|---------------------------|-----------------|-------------|
| 1975 | 1914 | 13 | 0.68 |
| 1976 | 2124 | 27 | 1.28 |
| 1977 | 2303 | 23 | 1.00 |
| 1978 | 2500 | 30 | 1.20 |
| 1979 | 2897 | 38 | 1.31 |
| 1980 | 2818 | 41 | 1.45 |
| 1981 | 3084 | 90 | 2.91 |
| 1982 | 2981 | 87 | 2.91 |
| 1983 | 3246 | 147 | 4.53 |

| | | | |
|------|------|-----|------|
| 1984 | 3339 | 165 | 4.95 |
| 1985 | 3875 | 257 | 6.63 |
| 1986 | 3704 | 286 | 7.72 |
| 1987 | 3467 | 287 | 8.28 |
| 1988 | 3271 | 298 | 8.74 |

Table 5 : Percentage Share of Women for all Science Disciplines at Different Levels of Employment

| Country | Year | Full Prof. | Associate Prof | Asstt Prof |
|-------------|---------|------------|----------------|------------|
| Ireland | 1992 | 3.0 | 10.0 | 20.0 |
| UK | 1987-88 | 3.0 | 6.0 | 14.0 |
| Netherlands | 1988 | 2.1 | 4.6 | 14.7 |
| FRG | 1990 | 2.6 | 7.3 | 24.2 |
| Portugal | 1984-85 | 8.2 | 26.5 | 36.2 |
| Turkey | 1989 | 20.0 | 23.0 | 27.0 |
| US | 1992 | 14.4 | 28.9 | 42.3 |

Table 6 : Degrees to Women in Physics and Women as Physics Faculty


| Country | Degrees to Recent Graduates | | Faculty |
|-------------------------------------|-----------------------------|-----------|---------|
| | Bachelor's | Doctorate | |
| Belgium | 33 | 29 | 11 |
| Brazil | 24 | 31 | 18 |
| Democratic German Republic | 12 | 18 | 8 |
| France | 24 | 21 | 23 |
| Hungary | 50 | 27 | 47 |
| India | 25 | 26 | 10 |
| Ireland | 22 | 20 | 7 |
| Italy | 29 | 21 | 23 |
| Japan | 7 | 4 | 6 |
| Korea | 20 | 5 | 3 |
| Netherlands | 20 | 4 | 6 |
| New Zealand | 10 | 11 | 6 |
| Philippines | 28 | 60 | 31 |
| Poland | 14 | 17 | 17 |
| South Africa | 24 | 21 | 9 |
| Spain | 17 | 21 | 16 |
| Turkey | 38 | 17 | 23 |
| Union of Soviet Socialist Republics | 34 | 25 | 30 |
| United Kingdom | 16 | 12 | 4 |
| United States | 15 | 9 | 3 |

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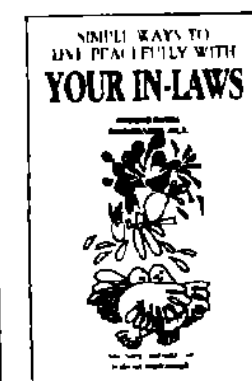
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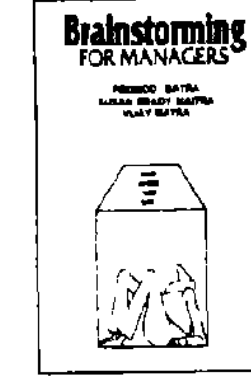
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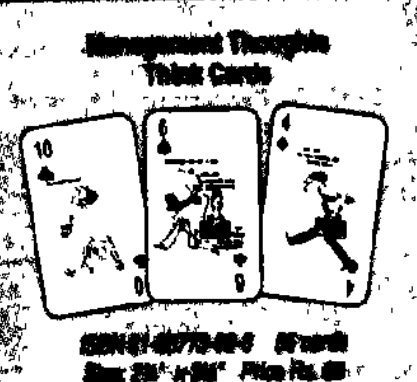
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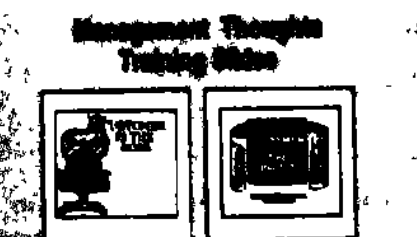
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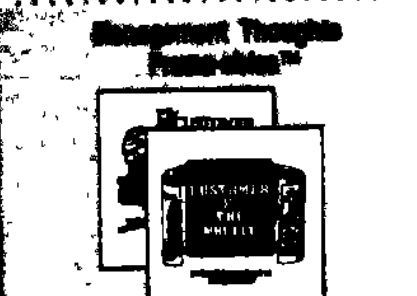
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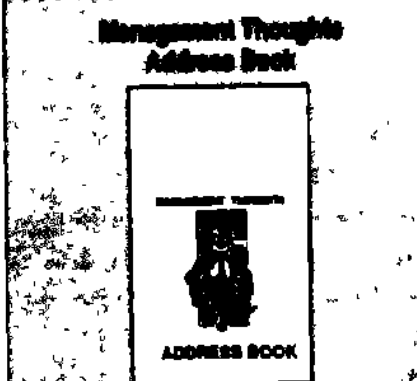
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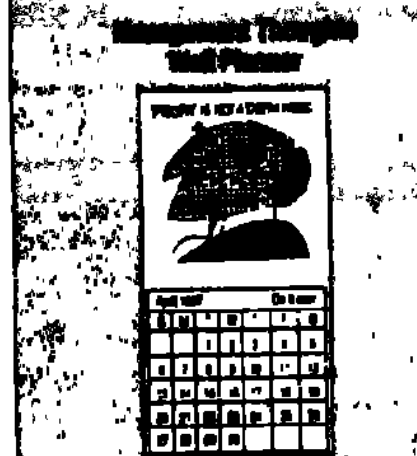
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Teachers for the Twenty First Century

Redefining Professionalism for Global Perspective

Saroj Pandey*

Introduction

During the last few decades the world has witnessed unprecedented explosion in major areas of knowledge, population and aspirations. The phenomena of globalisation which made its first appearance in the economic sphere has spread to all walks of life including education

As a result of rapid growth in science and technology, and development of transportation and communication network, the world is shrinking into a global village with blurred political and geographical boundaries. In the existing circumstances no individual or nation can remain unaffected by the happenings in any other part of the world. Therefore, the future generation has to acquire new skills to cope with the demands of the complex society of twenty first century.

Another distinguishing feature of the twenty first century shall be the widespread use of electronic information and communication media both in day-to-day personal life at home and academic life at schools. With the satellite channels invading majority of homes in developed and developing countries, especially in the urban areas, the value systems are likely to undergo tremendous turmoil. As a consequence children will come to school bearing the imprint of a world—real or fictitious far beyond the boundaries of the family and the immediate community. Ever increasing graph of violence and other criminal activities indulged in by youth and adolescents, even by children under the influence of electronic media indicate the seriousness of situation. Therefore, the system of education shall have to be reoriented to instil values among children. Teacher in the coming century will have to play a major role in helping the learners to distinguish between the real and imaginary world and try to strike a balance between the two.

The twenty first century shall be characterised by the emergence of multiculturalism in many countries due to large scale migration taking place as a

result of industrialisation, urbanisation, globalisation and disintegration of joint family system. This will necessitate inclusion of multicultural education in schools. The citizens of tomorrow's world should be trained to be more tolerant and understanding towards various cultures free from any ethnic and cultural prejudice. At the same time, the global perspective must be balanced against the local and ethnic context. The nation's unique cultural and traditional identity and value system should not be lost in the race of globalisation. Therefore, the system of education shall have to be reoriented to play its combative role to check the invasion of cultural imperialism and enable future citizens to maintain a balance between their own cultural and traditional heritage and values of other cultural and social groups.

Yet another striking feature of emerging society shall be a shift in emphasis from directed learning to self initiated learning. Due to easy access to electronic media and distance mode of education, the learners of tomorrow's world are expected to be more independent and autonomous. The fast expansion and adoption of distance mode of education at all levels may reduce the need to devote much time within the four walls of the classroom. What would be the role of teacher in such circumstances? Would the function and importance of teacher be diminished? What type of professionalism is expected from teachers to effectively handle such situation? Do our teacher education institutions equip the trainees with necessary skills and competencies to deal effectively with the needs of emerging society? These are few pertinent questions which the paper attempts to answer.

Role of Teacher in the Emerging Society

As education is viewed as an instrument to develop the cognitive faculty, tolerance and understanding among learners and prepare citizens to understand and face the realities of globalisation, the role of teachers in the emerging society will definitely change from what it is today.

The need for change from narrow nationalism to universalism in its various manifestations places enormous responsibilities on teachers who participate in moulding the character and mind of the new generation. Their role will change in the coming years.

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from mere technicians i.e. imparters of knowledge to interpreters of knowledge in the national context with a global perspective, and act as communicators of change. However, the major shift in the role of teacher that the world may witness in coming years is that instead of exerting direct influence on learners the teacher shall be expected to be more of a catalytic agent initiating the process of change. On the one hand teachers shall have to develop the competencies to help learners in the techniques and strategies of knowledge acquisition and application, acquire strategies for peaceful and harmonious co-existence with others, and learn strategies to actualise their own potential. On the other hand they shall be required to display greater firmness in relation to fundamental values that should guide each individual's life. Therefore, a teacher will continue to be the single most influential factor in the life of learner in the next century also

Teaching Profession : The Identity Crisis

Teachers in the contemporary society, therefore, need to be thorough professionals fully equipped with, both, high academic standards, pedagogical and practical skills and ethical and moral values. However, it is unfortunate that teaching is still in a transitional stage and is experiencing serious occupational identity crisis. The debate on whether teaching can be called a profession dominates the educational scene even at this fag end of twentieth century. Teachers, often themselves are uncertain as to the nature of their occupation and to which category they belong—non-professional, semi-professional or professional. There is a feeling among the teachers that they have been accorded a second class status while being given first class responsibilities.

Teacher educators as a world wide group also seem to lack clarity on the professional identity of teaching and the nature of teacher education, whether at the pre-service or in-service levels. As a result, they have not developed clear mission statements for their enterprise. Such confusion may be damaging for the teachers and their occupation. It may also create an obstacle in delineating the professionalism expected from them for the emerging society. Therefore, it is high time teaching is accorded the status which other professions like medicine, law etc enjoy

Teacher Professionalism in the Twenty-first Century

The rapid changes occurring in the world are ex-

pected to bring revolutionary changes in the society as a whole and education in particular. The rate of increase of new knowledge and demand for highly trained personnel have two implications for teaching in future; the pre-service programme for the preparation of new teachers will have to be upgraded in quality and its duration will have to be expanded, and a teacher will be compelled to continuously update and upgrade his stock of knowledge as his knowledge reserves may become obsolete and outdated after some time due to explosion of knowledge. Few important questions that need to be pushed to the top of the agenda of professionalism for emerging society are as follows :

- * How can we develop skills and competencies among teachers required for a global village?
- * How can initial training, induction and continuing professional development be more effectively related to each other?
- * How can we develop positive self-image among teachers and motivate them to give higher priority to their own learning?

Professionalism for a global society demands teachers to be innovative in their attitude, flexible in their approach and inquisitive and reflective in their mind — always refreshing themselves with the day-to-day increase of knowledge in their subject area. They should be able to develop cross-cultural understanding and see life from a global perspective. At the same time they should be able to recognise and value the human potential of learner put under their charge and provide enriched environment for their proper growth. Teachers are also expected to develop better understanding of human relationships and their environment

Professionalism, therefore, implies professional preparation of teachers and their professional development through the mechanism of continuous in-service training programmes. The National Policy on Education (NPE 1986) has rightly remarked that 'teacher education is a continuous process and its pre-service and in-service components are inseparable' (Para 9.4, p. 26). NPE (1986) suggested complete overhauling of the system of teacher education and establishment of District Institutes of Education and Training (DIETs) and State Councils of Educational Research and Training (SCERTs) to bring qualitative improvement in both pre-service and in-service education of teachers. However, the utilisation of these institutions to their maximum capacity is still a distant dream in the absence of adequately trained per-

sonnel and proper infrastructural facilities etc.

Professional Preparation of Teachers

It is obvious that teachers in the coming century will have to develop professional competence and efficiency from a global perspective. However, an introspection of the existing teacher training institutions and teacher education puts them in very poor light. The future vision in existing teacher preparation curriculum is totally lacking leave alone preparing teachers for a global village. This lack of dynamism may be suicidal for the whole system.

Teacher education institutions are expected to equip future teachers with latest methods, techniques and strategies for imparting instruction including the use of media devices and educational hardwares. But most of existing teacher education institutions either do not have such facilities or they lack the will to utilise these facilities or do not have adequately trained human resources to use these facilities for the benefit of teacher trainees, with the result, the teacher education programmes available in the country are hardly adequate to turn a trainee into a professional.

A profession generally requires a prolonged period of preparation along with a sizeable body of specialised knowledge and observance of professional ethics by its members. The existing nine months duration of teacher education course which reduces to hardly six months training programme for all practical purposes including, both, the theory and practice teaching classes, is totally inadequate to prepare professionals, and needs to be increased for at least two years with immediate effect. The generalised nature of training programme, its content and weightage given to theory and practice are other areas of concern.

Another crucial issue in this regard is the entry qualifications of teachers. If the profession is to become more successful in the future, then entry qualifications should be raised to at least graduation level for primary teacher training, with an emphasis not only on academic qualifications, but also on personal qualities and aptitude for teaching. This is essential keeping in view the ever increasing amount of knowledge and the desire to compete with other countries which will make school curriculum more challenging in the years to come.

The curriculum of teacher education is under constant criticism. The present rate of explosion of scientific and technological knowledge demands a dynamic and continuously evolving curriculum of teacher education. The changes likely to occur in the

twenty first century need to be visualised and suitably incorporated in the curriculum. However, it is unfortunate that over the years adhocism has gone deep into the system and often modification in the curriculum is based more on the judgement of experts regarding what a teacher should know and practice rather than on any empirical and systematic analysis of the tasks a teacher has to perform. The curriculum as practiced at present does not demand rigorous work from trainees and does not develop professionalism.

A crucial part of education is classroom interaction of learners and teachers with the extraordinary ability of teachers to generate sparks of learning, even in the adverse circumstances. The practice teaching as followed in teacher education institutions hardly develops such foresight among teachers and has very little relevance to the situations prevailing in classrooms. Furthermore, Indian classroom scenario, with its linguistic, cultural and religious heterogeneity provides a unique laboratory to teachers to practice tolerance and understanding in classroom situation being strongly advocated for the years to come. However, not many teachers are equipped with necessary skills to utilise this unique opportunity for the benefit of learners.

The curriculum, therefore, should make all possible efforts to increase further teachers' awareness of global interdependence and must include a global perspective. The teacher education reform depends upon identifying the knowledge base for competent teaching in the emerging society and developing the content and pedagogy for the same. The teacher education curriculum should, therefore, be able to integrate our old and authentic past with the living present of existing realities and the needs of emerging future society. It should be able to prepare teacher trainees to:

- * perceive and value linguistic, cultural and religious diversity within the country and in the world;
- * update their perceptions of other cultural and national groups based on authentic evidence free from personal prejudice or bias;
- * understand economic interdependence of nations and apply this knowledge in their working lives;
- * be aware of the societal problems confronting learners like violence, drugs, discrimination on the basis of caste, creed and sex and be fully equipped with the techniques of coping with such problems;

- * be aware of threats to environment and of strategies to protect and improve environment;
- * be able to appreciate and integrate their own and western culture without losing their national identity. They should be able to appreciate the distinctiveness of their own culture and values from an international perspective.

Preparing teachers for a global world, therefore, is a cumbersome process requiring careful planning and future insight among planners. The National Council of Teacher Education (NCTE) has initiated steps in this direction and prepared a discussion document on curriculum framework for teacher education keeping in view the needs of tomorrow's global world.

Teacher Development

In the emerging scenario every profession is trying to ensure renewal of learning by all its members within a reasonable period of time. Absence of such inputs results in weakening of expertise and skills. This is equally relevant in case of teachers. However, it is unfortunate that teachers and the teacher educators, both, tend to get alienated from the mainstream of academic life after a few years of joining their profession. At a time when the knowledge is expanding fast, they can hardly afford to remain static. In-service education, being an adhoc and sporadic activity in many parts of the country, has failed to make a visible impact on quality improvement. The existing models of in-service education have also outlived their utility. The nature, technique and methodology of in-service education needs to be given a new shape after a thorough study and analysis of needs of learners, teachers, and the system of education. The developments in the field of technology have made it clear that the twenty first century shall be a knowledge and technology driven century. Revolutionary changes are already being experienced in teaching and training methodologies due to use of various electronic software. The experiments conducted by NCERT for the training of teachers of Karnataka and Madhya Pradesh through teleconferencing are precursors of teacher training through distance mode. Use of the distance mode of in-service education and strengthening of DIETs and SCERTs may help to revive the hope of quality in-service training programmes.

Professionalism in the twenty first century expects teacher to be a keen researcher and an intense practitioner. The existing tripartite division of labour between researchers, university professionals and practising school teachers need to be abolished. Uni-

versity teachers generally distance themselves from schools and school teachers are often seen as students not as colleagues in the educational endeavours. The school teacher, too often is, thus, isolated not merely behind the classroom doors but also in the profession. Such tendency affects learners and the education system as a whole. Therefore, the need of the hour is that professionals at all levels of education join hands together in the welfare of learners and quality improvement of education. The teacher himself should be a keen researcher experimenting with new ideas and methods, and not merely implementing pedagogical ideologies imposed from outside by higher levels of authority.

Professional teachers must be capable of profound reflection on practice component which they know and follow in classroom situation and theory or literature they read. They should be able to observe, document and analyse their own practice and experience and solve their day-to-day classroom problems empirically on the basis of testing various alternatives. This suggests that, they should be well versed in the techniques and methodologies of action research and use it as and when need arises. Each of these skills needs to be fostered through continuous and school based in-service training programmes.

Professional Accountability

At present an individual teacher's performance is monitored by the principal or educational authorities of varying levels of hierarchy. However, teachers for a global world are considered as moral agents of change and not merely technicians imparting knowledge. This changes the whole concept of accountability, because of, first, the teachers' willingness to accept the responsibility of moulding the behaviour of students; second, the access and right of community to know what is going on in the school, and third, the teachers become the judge of students improvement in learning. The professionalism of future, therefore, places major responsibility on the shoulders of teachers for the full development of students' personality with emphasis on self-reliance and ability to foresee changes, and to adjust to them and develop tolerance and understanding for others. The teachers of the next century, therefore, will be held accountable for developing critical faculty of mind and not only for high academic performance of students under their charge.

The Emerging Strategies

The globe is slowly moving towards the histori-

cal moments of transition to twenty first century and education is seen as the most crucial instrument to face the challenges that the future holds in store. As such teachers have to perform a crucial role as catalytic agents of change and modernisation. Teachers in the coming century will have to perform the role of reformers by way of generating the need for change and helping community and students to adjust to the changing conditions and emerging socio-economic and educational needs. Preparing professionals with such vision is an uphill task and expects a new paradigm of teacher education programme involving improved entry qualification for teachers, longer duration of training and modification in content, structure, and pedagogy of teacher education curriculum. The curriculum shall have to be more dynamic and responsive to the demands of emerging society and school curriculum like multicultural education, human rights education, value education, computer education and use of technology in transaction of curriculum.

Professional teachers for the global world need to be fully equipped with rigorous intellectual and moral qualities to understand and value their own culture and cultures of other parts of the globe, maintain a balance between the two, and help learners to view various events happening around them with open and objective mind and in a broader perspective. However a conscious effort needs to be made to balance the global perspective against the local and ethnic perspective to guard against the invasion of cultural imperialism.

Linkage between teacher education institutions, schools and universities which is non-existent today needs to be established. The future teacher should be able to visualise his/her problems and solve them.

The twenty first century shall be a knowledge oriented, technology driven and fast changing society. The teachers shall be required to continuously update and upgrade their stock of knowledge through a well organised mechanism of in-service training programmes on regular intervals. A well planned system of in-service training programmes utilising both, conventional and distance mode, and strengthening and networking of institutions at different levels may help to prepare such professionals.

Professional teachers' judgement should be linked to appropriate accountability for student learning, broadening the horizon of their knowledge and developing capacity among learners to think locally and act globally, rather than to a particular authority.

Last but not the least no system of education can flourish without the support of community and gov-

ernment. Political approach to educational policy plays a vital role. Faulty and short-sighted educational policies and lack of political will to implement them in their full spirit may lead to educational catastrophe. Therefore, a partnership between school-community and the government needs to be developed on a priority basis.

In sum, the dream of a learning society, can become reality only when the dream merchants (teachers) are well equipped with moral, professional, intellectual, practical and communication skills to convince the customers, through their efficient service.

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Effectiveness of Advance Organizers for Teaching Biological Science

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Teaching is both an act and an enterprise. It takes place in different types of educational establishments, secondary schools, colleges and universities, each of which share with one another common roles, rules and definitions of purpose to influence the lives and behaviour of students.

Joyce and Weil (1981) define teaching as a process by which the teacher and students create a shared environment including sets of values and beliefs which in turn colour their view of reality. A model of teaching is a plan or pattern that can be used to shape curricula (long term courses of studies), to design instruction in the classroom and other settings. Thus, a model of teaching consists of guidelines for designing educational activities and environments. It specifies ways of teaching that are intended to achieve certain kinds of goals (Joyce and Weil, 1978). Models are prescriptive teaching strategies designed to accomplish particular instructional goals (Eggen Paul, D. et al., 1979).

Models are based on practice, empirical work, theories and research done by educational researchers. Joyce and Weil (1980) developed more than 20 models which were grouped on the basis of their chief emphasis — the way they approached educational goals and means. They have classified models into four families—Information Processing Models, Social Interaction Models, Personal Models and Behaviour Modification Models. Information processing refers to the ways people handle stimuli from the environment, organize data, sense problems, generate concepts and solutions to problems, and employ verbal and non-verbal symbols. Personal Models emphasise the processes by which individuals construct and organize their unique reality and focus on helping individuals to develop a productive relationship with their environments. Social interaction models emphasize the relationship of the individual to society or to other persons. Behavioural models emphasize on the behaviour theory. The common thrust is an emphasis on changing the visible behaviour of the learner rather than the underlying psychological structure and the unobservable behaviour. Some

models are simple and easy to use while others are complex and difficult to master.

A highly skilled performance in teaching blends the variety of models appropriately and embellishes them. Once a teacher masters the "basic" repertoire of appropriate models, he or she can then expand it by learning new models and by combining and transforming the basic ones to create new ones (Joyce and Weil, 1980). A model-of-teaching approach emphasises the need for variety in the classroom by developing a teacher's repertoire of instructional approaches to meet a range of objectives. The teacher who utilizes a variety of instructional approaches is more likely to reach all students in the classroom; moreover students are encouraged to learn in a variety of ways (L.C. Singh, 1995).

Since the early eighties, efforts have been made to indianise the models of teaching. It is common knowledge that the Lecture Method is one of the most popular among school and college teaching. David P Ausubel made an effort to design ways and means of improving the effectiveness of the Lecture Method. He propounded the theory of meaningful verbal learning and based on this theory, an Advance Organizer Model (AOM) was developed. The AOM can be used for verbal teaching as well as for developing instructional material.

According to Ausubel's theory of meaningful verbal learning, advance organizers are introduced in advance of new learning tasks and are so formulated that they take into account ideas and concepts already existing in the cognitive structure of the learner. They are presented at higher levels of abstractness, generality, and inclusiveness than the material to be learned, and they serve "to provide specifically relevant anchoring ideas for the more differentiated and detailed material that is subsequently presented." The theory of meaningful verbal learning and its derivative, the Advance Organizer Model of teaching, provide recommendations to teachers for selecting, organizing and presenting new information.

Ausubel's primary concern is to help teachers convey large amounts of information as meaningfully

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and efficiently as possible. The AOM is designed to strengthen students' cognitive structures, a term Ausubel uses for a person's knowledge of a particular subject matter at any given time and how well organized, clear, and stable it is. Ausubel maintains that a person's existing cognitive structure is the foremost factor governing whether new material will be meaningful and how well it can be acquired and retained. Before we can present new material effectively, we must increase the stability and clarity of our student's prior knowledge. Meaningful learning is intellectually linked to what we have learned previously. We must be able to transform this new knowledge and to apply it creatively in novel situations.

According to Ausubel, whether material is meaningful depends on the learner and the material, not the method of presentation. If the learner begins with the right "set" and if the material is potentially understandable, then meaningful learning can occur. The key to meaning involves solidly connecting the new learning material with existing ideas in the learner's cognitive structure.

Ausubel assumes that for meaningful verbal learning to occur, the learner plays an active role, whether covert, or overt. Moreover, this does not occur automatically, the teaching model for reception learning must be designed to facilitate these active mental operations.

Advance organizers are the primary means of strengthening cognitive structure and enhancing retention of new information. Ausubel describes advance organizer as introductory material presented ahead of the learning task and at a higher level of abstraction and inclusiveness than the learning task itself. Its purpose is to explain, integrate, and interrelate the material in the learning task with previously learned material. The most effective organizers are those that use concepts, terms and propositions that are already familiar to the learner, as well as appropriate illustrations and analogies. AO's have implications for both curriculum and teaching (Joyce and Weil, 1980).

The AO Model has three phases of activity. *Phase one* is the presentation of the advance organizer, phase two is the presentation of the learning material, and phase three is the strengthening of cognitive organization. Phase one consists of three activities — clarifying the aims of the lesson, presenting the advance organizer and prompting awareness of relevant knowledge. In *phase two*, teacher makes organization explicit, makes logical orders of learning

material explicit, maintains attention and presents material. In *phase three*, the teacher uses principles of integrative reconciliation and promotes active reception learning. Phase three tests the relationship of the learning material to existing ideas to bring about an active learning process.

Effectiveness of Advance Organizers

The effectiveness of advance organizers in promoting learning and retention has been a subject of debate and controversy.

At least three major reviews of advance organizer studies were conducted in the mid-1970s by Barnes and Clawson (1975), Faw and Waller (1976), Hartley and Davies (1976). In the first two reviews, the authors concluded, based on the investigations examined, that advance organizers did not facilitate learning. The results from the third review were mixed. According to Hartley and Davies (1976), Advance Organizers are more likely to be effective with reception than with discovery learning. They found that AO's have a greater effect on retention than on learning, and post organizers may be as effective as advance organizers.

Faw and Waller (1976) found that advance organizers are more likely to be effective when the material to be learned is difficult. Advance organizer tends to aid lower ability learners more than higher ability learners.

Ausubel (1978) labelled two types of advance organizers depending on the learner's degree of familiarity with the material. *Expository organizers* are used when the material to be learned is completely new, whereas *comparative organizers* are used when the material to be learned is familiar or relatable to previously learned ideas.

Further, Mayer (1978) stated that AO's tend to aid lower ability learners more than higher ability learners. Mayer (1979) asserted that subject areas where advance organizers might be most helpful are science and mathematics.

Lawton and Wanska (1979) found that advance organizers using both content and process concepts are more effective than advance organizers using either content or process concepts. Alexander, Frankiewicz and Williams (1979) revealed that written, visual and oral — interactive advance organizers have all been shown to facilitate learning and retention.

Kozlow and White (1980) indicated that comparative organizers tend to be more facilitative than

expository organizers. Advance organizers show greater facilitative effect when audio-visual aids are used.

Nugent, Tipton and Brooks (1980) found that advance organizers are likely to have an inhibiting effect on affect and student thinking. Chittriv (1983) while comparing the Concept Attainment Model and Advance Organizer Model with traditional methods in terms of performance on the concept knowledge test, found that the AO Model as well as the Concept Attainment Model were significantly superior to traditional method, whereas the Advance Organizer Model was superior to the Concept Attainment Model for teaching mathematical concepts to XI grade students.

Ghosh (1986) found that prose, passage type, pictorial type advance organizers facilitated the retention of the Life Science subject matter even after an interval of four weeks. Ghosh also observed that instructional strategy with a pictorial type of advance organizer was found to be better than the prose passage type of advance organizer. Pandey (1986) reported that both the advance organizer model and inquiry training model were significantly superior to the traditional method in terms of pupil achievement whereas all the three were equally effective in terms of pupil's attitude towards social studies.

Passi, Singh and Sansanwal (1986) developed a training strategy for training teacher educators in models of training. In this study, the concept attainment and inquiry training models were taken up. Budhisagar's (1987) study revealed that the AOM and Operant Conditioning Model were significantly superior to the traditional method in terms of achievement of B.Ed. students in Educational Psychology. Swrup, Budhisagar and Rajoriya (1991) conducted a study on effectiveness of advance organizers for teaching B.Ed. students and found that the instructional material with A.O. was found to be superior than the material without AO. Study habits on the whole did not have any significant effect on the achievement of the two groups studying through instructional material "with" and "without" advance organizers.

An Experiment

An examination of the available empirical evidence reveals that more research needs to be conducted for determining the effectiveness of Advance Organizer Model for teaching Biological Science at the school level. Hence, an experiment was con-

ducted in the classroom situation in a representative school of Rohtak (Haryana) to realize the following objectives :

- To develop lesson plans for a topic of Biological science in accordance with Advance Organizer Model of Teaching.
- To study the effectiveness of Advance Organizer Model of Teaching and traditional classroom teaching in relation to pupil achievement in Biological Science
- To compare the achievement of students of high and low intelligence taught biological science by Advance Organizer Model of Teaching and traditional classroom teaching.

The study was designed to test the following hypotheses :

- H₁ There is no significant difference between the performance of the experimental and control groups on the achievement test in biological science before commencement of the experiment.
- H₂ The students taught Biological Science through Advance Organizer Model will exhibit superior performance on the achievement test than those taught biological science through traditional classroom teaching.
- H₃ High and low intelligence groups of class VII produce equal level of achievement scores in biological science.
- H₄ The two instructional treatments yield equal results with both the levels of intelligence.

Sample

The research investigation was carried out on 80 students of class VII of a representative English medium school of Rohtak. The average age of the students was 12 years.

In order to obtain two matched groups of students, Cattell's Culture Fair Intelligence Test of General Mental ability was administered to all the 80 students of Class VII. After arranging students in ascending order of their intelligence scores, they were randomly allocated to two groups viz , the experimental group and the control group. Thus there were 40 students in each of the two groups. From each group, the 27% of students (top and bottom), were selected and thus four groups of 11 students each were made.

Design of the Study

A 2 x 2 factorial design was employed for analyzing the data of the present study. Total attainment was the dependent variable. The two independent variables, viz., instructional treatment and intelligence were studied at two levels each. The variable of instructional treatment was studied for teaching by Advance Organizer Model and traditional classroom teaching. The variable of intelligence was studied at high intelligence and low intelligence levels.

Tools Used

1. Cattell's Culture Fair Intelligence Test.
2. Lesson Plans were developed on the topic "Food Health and Disease" from the syllabi of Class VII students in accordance with Ausubel's Advance Organizer Model.
3. Achievement Test was developed to evaluate the initial and terminal behaviour of the students after framing instructional objectives. The test comprised of 60 items. Time limit was 45 minutes.

Classroom Experiment

The experiment was conducted in the following three phases given below :

Phase-1 : Administration of the Achievement Test in Biological Science/Pre-Test

Firstly, pre-test was administered to the students of both the control and experimental groups.

Phase 2 : Implementing Instructional Treatment

The experimental group was taught by the Advance Organizer Model of teaching for five days. The control group was also taught for the same time through traditional classroom teaching. Each day, the lesson was presented in 3 phases viz., presentation of AO, presentation of learning task or material and strengthening cognitive organization.

Phase 3 : Administration of the Achievement test in Biological Science/Post Test

After completion of the instructional treatment, the post test was administered to the students of both experimental and control groups.

These three phases marked the end of the experiment in the school.

Analysis and Interpretation of data

Means, standard deviations and t-value were

computed from the scores obtained by the students of the two groups.

Table 1 : Means, SD's and t-value for Pre-test scores

| Group | N | M | SD | t-value |
|--------------|----|-------|------|------------|
| Experimental | 22 | 21.86 | 6.02 | 0.106 (NS) |
| Control | 22 | 21.14 | 4.88 | |

Table-1 indicates that the mean values obtained by the two groups were almost identical. Hence, the two groups may be considered similar on the pre-test criterion.

Next, t-ratios were computed for the post-test scores obtained by the high and low intelligence group students of the experimental and control groups which have been placed in Table 2.

Table 2 : Means, SD's and t-value for Post Test Scores

| Group | N | M | SD | t-value |
|--------------|----|-------|------|----------|
| Experimental | 22 | 51.45 | 6.32 | 2.45 (S) |
| Control | 22 | 46.5 | 6.13 | |

The above Table reveals that the experimental group performed better than the control group with regard to post-test scores, which ultimately may be attributed to the treatment, i.e., Advance Organizer Model of Teaching.

Further the analysis of post-test scores was done through the technique of ANOVA. Results have been placed in Table 3.

Table 3 : ANOVA for Post-test scores for different Intelligence levels

| Source | SS | df | MSS | F | Level of significance |
|------------------|-----------|----|-----------|---------|-----------------------|
| Intelligence (I) | 31.11636 | 1 | 31.11636 | 0.7205 | NS |
| Treatment (T) | 270.02545 | 1 | 270.02545 | 6.4599 | S* |
| TXI | 1.83819 | 1 | 1.83819 | 0.04397 | NS |
| Error | 1672 | 40 | 41.8 | | |
| Total | 1947.98 | 43 | | | |

NS — Not significant

S — Significant at 0.05 level of confidence

Main Effects

Treatment

The F-ratio for the difference in the mean gains of the experimental and control groups was found to be significant at 0.05 level of significance. The two

groups may not be considered equal with respect to the mean gain scores. Examination of the means of the two groups reveals that the experimental group obtained higher means than the control group. This leads to the conclusion that AO Model of teaching was found to be more effective than the traditional classroom teaching in the segment of Biology.

Intelligence

The F-ratio for the variable intelligence was found to be insignificant even at the 0.05 level of confidence. This leads to the inference that the mean attainment of the two intelligence groups did not differ from one another.

Interaction Effects : Treatment x Intelligence

The F-ratio for the interaction between I and T was found to be insignificant (NS) even at 0.05 level of confidence. The results reveal that the achievement scores obtained by low and high intelligence groups were independent of the treatment.

In order to further investigate the post-test scores obtained by high and low intelligence students, t-ratios were computed.

Table 4 : Mean, SDs and t-value for the difference between means of post-test scores of students of high and low intelligence of the experimental and control groups

| | Experimental Group | | Control Group | |
|---------|--------------------|--------|---------------|--------|
| | HI | LI | HI | LI |
| N | 11 | 11 | 11 | 11 |
| M | 52.09 | 50.818 | 47.54 | 45.45 |
| SD | 6.2588 | 5.9206 | 7.2784 | 4.9793 |
| t-value | 0.5976 (NS) | | 1.118 (NS) | |

NS— Not significant

The above table reveals that the 't' value for the difference between means of high intelligence and low intelligence groups was not found to be significant for both the experimental and control groups. This reveals that high and low intelligence groups performed comparably in both the control and experimental groups.

Results

After analysis of data, Hypothesis No. 1 was retained, as both the experimental and control groups performed equally well on the pre-test.

Hypothesis No. 2 was retained as the students who were taught biological science through AO Model exhibited superior performance on the

achievement test than those taught the same science through traditional classroom teaching.

Hypothesis No. 3 was retained as the high and low intelligence groups of students of Class VII produced equal level of achievement scores in biological science.

Hypothesis No. 4 was also retained as the two instructional treatments yielded equal results with both the levels of intelligence.

Thus, it may be concluded the AO Model of teaching may be employed by teachers in schools, especially for teaching biological science.

The Final Word

The study has significant implication for teaching science students at school level. It is suggested that teachers should improve their presentation of content by employing Advance Organizer Model of teaching. Pupil achievement has always a context intimately connected with the instructional strategies and some instructional strategies are likely to stimulate pupil achievement more than the others. Advance organizer is one such strategy. Well designed lesson plans help teachers to improve their presentation and students to achieve positive transfer of learning.

Advance organizers are the primary means of strengthening cognitive structure and enhancing retention of new information. Its purpose is to explain, integrate and interrelate the material in the learning task with previously learned material. It is an elegant yet rather simple strategy that may be easily mastered by the teacher.

A special attention to the instruction for the low intelligence group should be paid, as this may enable them to attain scores comparable to the high intelligence group. The advance organizer strategy has its greatest applicability for those teaching activities — lecturing and leading recitations — that are most common in the classroom.

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Gender Imperatives in Sustainable Development Grassroots Assertions and the Research Agenda

Sushama Merh-Ashraf*

The centrality of gender as one of the major decisive factors in the future-directed human dimension of sustainable development can no longer be questioned or compromised. The gender issue, the voices and visions of women, not just for themselves, but for the entire social transformation has entered the developmental discourse in present times with far reaching implications inherent in it. This is increasingly becoming evident in the socio-political, judicial, and telecommunicational/media spheres including the crucial economic core that assumes an entirely modified orientation as hitherto invisible areas of concern and constructs linking development and gender come to fore. The echoes are very much resonating in the intellectual and academic world which fortunately has not remained in the exclusive confines of the concept and structural units under the umbrella of 'Women Studies' at various institutional levels. Strategies and search for interlinking and aligning gender perspective with the emerging understandings of sustainable development is an area which is agitating the minds of not only formalised arena of intellectual or academic institutionalised activity but is very much on the agenda of the grassroots assertions and enquiry of the strata of women who unfortunately are labelled as 'illiterate', 'backward', and/or 'primitive'. It needs to be clarified that the concept of sustainable development itself has been under critical scrutiny in recent years. The concept of environmental and economic sustainable development that seems to have acquired the status of a modern '*mantra*' is being re-examined and reassessed in the light of its socio-culturally and historically decontextualised framework. The gender issues and parameters are emerging as significant factors in reorienting the meaning of sustainable development within a socio-culturally relevant context.

Events and happenings during the past more than three decades represent a visible and firm saga of women's assertion towards empowerment, peace, equity among other related factors emerging as the basic tenets for the future of society and the world at large. In the context of India, it needs to be underlined that while the intellectual discussions and debates are playing their role, it goes to the credit of the

grassroot level, poor, oppressed, 'non-literate' women, who through their individual and collective efforts are inadvertently generating a corpus of experience and knowledge bringing new insights, attention, and holistic understandings crucial and central for laying down a reformulated framework for sustainable development in social and ecological terms, not only in India but for the world at large. Notwithstanding the reservation debate that is echoing in the corridors of various political echelons, including the 33% reservation for women at the panchayat level, it is the spread-out impact of their actions and assertions all over the length and breadth of the country that is unwittingly drawing our attention to the far reaching implications for reorienting fundamental policy positions, basic theoretical, intellectual, educational, organisational and institutional parameters. The impact has initiated a process of 're-redefining' the concept of development with its linkages, not only to environment and resources, but to technology, human dignity, equality, peace and human rights etc within a holistic framework. Through the alternative vision being evolved by women's efforts in recent years, recognition is being accorded to the value of the indigenous knowledge, folk ecology, the concept of biodiversity, including concept of 'work' inherent in cultural terms within the parameters of socio-ecological balance for a dignified human life and sustenance. In India there has been a multiplier effect not only of the *Chipko Andolan* or the Anti-arrack experience, but many more collective actions and voluntary organisational efforts evident in the hill areas, such as in the Kumaun region, in the deserts of Rajasthan, in the southern states of India — for instance the agitated assertions of the fisherfolks of Kerala and the like. The print and television media have increasingly begun to report and document some of these experiences to some extent with a number of young tele- and print-media journalists, some of them women, becoming more and more aware and conscious of the significance of the unparalleled course of events and impact as the gender experiences gradually gather momentum.

The Emerging Contours

Formulation of the Gender Empowerment Measure (GEM)

During the 70s, with the pronouncements of the

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Environmental Conference at Stockholm in which India played a lead role, it was the complex dynamics of poverty, lack of development, lower status of women, the positioning of the population issue within the global perspective of rapid growth in the developing world as against the overconsumption and exploitation of resources by the developed countries including their life patterns and other factors which had to be examined and redefined in human terms within a just and relational framework at the global and local levels. It is interesting to note that since this turning point, gender issues have played a crucial role in deciding and designing the theoretical tools and parameters of research as well as evolving policy formulations in the quest for recombining various components in pursuit of sustainable development. Limitations of the paradigm of economic development based on Gross National Product (GNP) etc came under scrutiny by the late 70s. By the 80s, it was the concept of the Physical Quality of Life Index (PQLI) that emerged as a comprehensive index of development which included indicators, such as, infant mortality, life expectancy, and adult literacy into a single index. The expression of gender in this accounting was limited to the inclusion of sex based differentials between male and female population. Within the academic structural and disciplinary parlance women's issues brought to focus and convergence the experiences and actions of social activists, feminists, researchers, professionals, grassroots level women collectives and movements to generate a corpus of gender based data-information coupled with a resounding voice and reinforcing visibility which began challenging the fundamental bases of the prevailing developmental and technological paradigm adversely affecting not only their lives but the very central nerve of the fabric of life and society. By the 90s there was a concern and call for examining and reassessing the 'assumed' benefiting effects of 'development' on women, re-posing the question of a culturally humanised development model for the human society. Thus emerged the formulation and formula of — the Human Development Index (HDI) encompassing the factor of standard of living as an important criteria by incorporating the concept of 'income' as an added dimension to address gender disparity and inequity. (India stands at 134th position in the comity of nations at present in this context).

Eversince the construction of HDI in the 90s, relentless efforts have been made to modify and diversify it from the gender perspective. For all practical purposes HDI is gender neutral in its impact. Researchers in recent years have noted that HDI across

the countries of the world falls short of indicating parity when adjusted for gender disparities. This reiterates and reinforces the conclusion that in no country there exists equality between sexes and equal treatment to women on par with men is a goal far remote in various societies, whether 'developed' or 'developing'. In this context it is being increasingly recognised that if human development is to enhance equal access to opportunities and ensure enhancement of productive experiences and productivity it becomes essential to study and reformulate gender issues in a detailed manner. In recent years social researchers including economists have been extensively working in this area bringing in new insights and information underlying the significance and centrality of the gender perspective in sustainable development. The present area of concern in the field of development therefore deals with, what is termed as — 'the Gender Disparity Adjusted HDI' or the 'GDI' in order to meet the inadequacies of the existing developmental paradigm in technical parlance. Interestingly, the quantitatively calculated GDI value which represents the measurement of gender empowerment, termed as the Gender Empowerment Measure or the GEM introduces an additional dimension to the GDI, viz., 'relative empowerment of men and women in political and economic activities.' For this, two variables are being taken into account in combination with the income index, viz., — (1) An index of parliamentary representation by women and men indicating their political power and decision making capacity; and (2) a combined index of (a) administrative and managerial representation and (b) professional and technical representation of women and men indicating their economic participation and decision making. The exercise albeit is still at an experimental level. The main purpose of elaborating on the foregoing technical aspect of the gender considerations at the theoretical level is to underline the far reaching implications and impact of women's voices at the grassroots level in recent times in India lending support to the concretisation of women's issues in human terms of equality, justice, and peace in the minds and sensibilities of people who are in quest of a sound foundation for achieving the goal of gender parity and gender justice in human development. The significance of the 'recycling' of the grassroots level assertions of the so called 'backward' and 'uneducated/illiterate' women's organised or unorganised, collective, and/or individual efforts into the developmental debate, resulting in redesigning the theoretical tools at one level and defining parameters of alternative visions for future of mankind is an unparalleled achievement that is perhaps

no less significant and praiseworthy than other major 'patriarchal' human achievements. A big step towards World future is thus inaugurated with women's future as an '*a priori*' condition. The transformational impact of the gender perspective thus emerges as the central and focal point of reference equally at the intellectual and practical levels for the developed as well as developing regions of the world alike and in unison.

One does not have to go far to realise the implications of the new gender orientation that defines the crucial areas of either 'Population Crisis' in the Asian countries or the global environmental issues. The role of women is to be seen and culturally nurtured as 'equal partners', not just the 'better halves'; but as competent problem solvers and decision makers; empowered participants in initiating and evolving the real essence of sustainable development. This throws a challenge to the upsurge of globalisation and the economic liberalisation policies with the incoming propositions of multinationals and the threat to the very essence we are trying to evolve in human and gender terms. In past few years the 'Eco-feminism' perspective has vigorously questioned the basic assumption of the UN-Decade of Women in terms of the diffusion of developmental benefits to women as a logical corollary to the hitherto prevailing developmental paradigm. In this context it is not out of place to remind ourselves that in 1987, while the Noble Prize for Economics was given to Professor Robert Solov of MIT for his theory of growth based on dispensability of nature, an Alternative Noble Prize (popular name or the Right Livelihood Award) was instituted and given to honour the women of '*Chipko Movement*' for 'vision and work contributive to making life more whole, healing our planet and uplifting humanity'. This, it is needless to say was for grassroots level women as leaders and activists who had put the life of forest above their own and through their actions had made an unparalleled statement with respect to sustainable development in relation to nature as indispensable to the process and dynamics of the same notwithstanding the technological feats that do pose a threat if not put into the sustainable fold as being defined by the evolving gender paradigm.

The Paradox of the Indian Experience

With women emerging as prime movers in the process of transformation of societies in a fundamental sense, the concept of 'Empowerment' so very basic to the transformational imperatives of the untiring efforts of women in recent times, needs to be exam-

ined critically and understood in its paradoxical manifestations within the Indian experience. It was while deciphering the dimensions of the motto of 'Equality, Development and Peace' of the UN Decade for Women 1975-1985, that the term 'empowerment' became a strategic aspect in the field of sustainable development. Srilatha Batliwala (1994) observes in her article :

"In grassroots programmes and policy debates alike, empowerment has virtually replaced terms such as welfare, upliftment, community participation, and poverty alleviation to designate the goal of development and interaction."

While 'power' is the key word in the expression 'empowerment' — it implies control and a say in the decision-making process and intervention strategies whether concerning social, economic, or political aspects of life at the family or societal levels including a right over their own biological functions and needs. We have to admit in all humility, despite the contributions of women working at the grassroots level as described in the earlier account, majority of women in India do not enjoy an empowered status. The so called 'educated' and reasonably those in advantageous positions also remain handicapped in social and economic terms. The prevalence of atrocities of severe nature, such as female foeticide and misuse of amniocentesis is just one example in economically advanced states such as Punjab or Maharashtra to name just two. Violence against women, dowry deaths and the social attitudes of women and men despite exposure to education and better quality of life conditions signifies the ineffectivity and paradox of the persistent human problems that nullify the efforts at all levels for making justice and sustainable development a reality. In the light of the fact of empowerment being manifested by marginalised groups as reflected in the anti-arrack movement or by some 'lower caste' women winning panchayat elections, or of programmes such as under '*Mahila Samakhya*' — a collective showing extraordinary capacities of decision making and organisational competencies among women, it has to be underlined that 'empowerment' for majority of women is still an elusive goal. No doubt in recent years, several grassroots level activities of women show their ability to grasp scientific technological concepts, learn to ride bicycles, learn to repair hand pumps or drive tractors, undergo training in electronics or computers, it still is not indicative of their empowerment or participation in decision making. The percentage of women entrepreneurs and those

entering into professions such as medical, technology, electronic communications, or computer based occupations, their status and control over their lives remain minimal and in the hands of someone else throughout their lives.

It is interesting to note that in recent years grassroots level organisational work is assuming a professional stature and look. The 'bare-foot' social worker today is emerging as a professional with qualitative upgradation and a technologically equipped posture. One has just to peep into this world to notice that the crucial power positions are occupied by men with negligent exceptions to prove the rule. Thus the issue of empowerment cannot be tackled aspectually and as a decontextualised variable. Unless the idea in its total social and cultural context and ideological terms is imbibed into the psyche and mindset of the complete practice, habit and behaviour of the entire people at large, inclusive of men, women, families, communities, institutions, education etc, women's empowerment will only remain a news item, an illustration for intellectuals, a theme for seminars, an area which can get research funds, or provide a galvanising point to get women's development and research unit tucked in the structural corner of a university of no consequence, or at the most, a factor in the formulation and formulae aspects in the development index. It may never become a practicing custom or reality. In this context the whole society has to adopt strategies and methodologies, if you may, to come to human and cultural common understanding about empowerment of women on equal and just terms, particularly keeping in mind the fate of the disadvantaged and oppressed. Efforts towards connectivity, linkages — at the institutional and voluntary level, recognition and applause for innovative efforts at the grassroots level by women, assigning value to their unorganised but productive work, to crystallise and give multiplier momentum to women's consciousness and ethics for future, underlying the principles of trust, harmony, peace and equality, are some of the crucial points to ponder in the context of the foregoing discourse. The gender dimension thus needs to be linked with all spheres of life and living. It is increasingly felt that strategies are needed to go beyond the fragmentary composition and design of women's efforts to weave them into the broader fabric of society and human development in a transformational and sustainable framework. This is a befitting resolution at the instance of our completing 50 years of independence from the British colonial rule 'Colonial' mindset of our own psy-

che is a challenge we are faced and forced to encounter with the emergence of the gender dimension as a critical and limiting factor to acquire civility and attain the goal of sustainable development in civilisational and cultural terms. Are we geared to take up the unprecedented challenge? How do each of us in India educate ourselves in this endeavour? By developing and opting for Women's Studies courses in the educational streams? By incorporating gender dimension in various disciplinary research agenda? By holding seminars and conferences? By adding 'Literacy "Burden"' to already overburdened disadvantaged womenfolk of society? — Where does the plethora and st(r)ing of questions stop?

It is time for the entire society to deeply and decisively confront and address these questions devoid of bias and prejudice at all levels and within all spheres of life.

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Reengineering Technical Education

A.G. Matani*

We are witnessing a world in which corporate wealth, once measured by annual revenues, is being replaced by a world in which success comes from generating new ideas for tomorrow. These dramatic changes require us to look at our training & curriculum and at the work force in a new way. Organisations need people who can quickly adapt, who can shelve skills on longer current and immediately replace them with new capabilities. They must learn how to manage the ever-burgeoning amount of information generated by a post-industrial society. They must know how to judge when information is obsolete and understand how to stay ahead of the pack.

As organisations evolve to be more competitive in a global economy, workers must be encouraged, empowered and inspired to succeed in an environment of continuous change. Engineers who once depended on slide rules now redesign entire structures on interactive note pads, communicating online with clients or co-workers a continent away. Executives, formerly buried under mountains of reports, now use decision-support systems to access diverse sources of information to align their organisations against constant competitive pressures.

9th Plan Education Goals

The 9th Plan for Higher & Technical Education has identified the following goals to be specially dealt with :

- Relevance and quality of education
- Access and equity
- University and social change under which continuing education and women's studies are given special importance
- Management of education
- Finance.

Major Changes in Industries & Competencies Required

The major changes expected in the industrial and business environment are :

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| Major Changes in Business/Industries | Competencies Needed |
|--------------------------------------|--|
| Increasing Competition | — New management technologies — Learning new success factors |
| Fast Developing Technologies | — Higher knowledge base — Need for technical competence — Need for continuous updating |
| New Patterns of Work | — Higher competence needs — More individual responsibility — Professional competence & expert skills rather than general skills — Need for broader skills |
| Internationalisation | — Need for communication/interpersonal skills |
| Ageing Workforce | — Diversification, Motivation — Management & leadership |
| New Values | — Recognition of changes — Career growth — More mobility |

Changes in Companies

- Decentralisation
- Increasing cost effectiveness
- Net-working
- Management style
- More Vendors-Techno Entrepreneurs

Changes in Market

- Internationalization
- Increasing competition
- New success factors
- Technical competence awareness
- Customer demands
- Shorter product cycles

Changes Among Employees

- New values
- Increasing mobility
- Higher education
- Multiple careers
- Customer demands
- Increasing competition about jobs
- Ageing

Employee
Competence
Development

Changes of Work

- Rapidly outdated Knowledge
- Technology impact
- Changing job description
- Increasing co-operation
- Globalisation

Figure 1 : Factors in Employee Competence Development

Relative Skill Emphasis of the 21st Century

A summary of the competencies and skills requirements that are likely to be emphasized are

compared in Table-I below. A blend of these skills will lead to improved performance and productivity of techno-managers.

| <i>Skill Area</i> | <i>Engineers</i> | <i>Managers</i> |
|------------------------|--------------------|---------------------|
| Managing Change | Adaptability | Versatility |
| Team-work | Interpersonal | Collaboration |
| Thinking | Creativity | Innovation |
| Empowerment | Initiative | Courage |
| Learning | Learn-how | Developing others |
| Personal Effectiveness | Self-Management | Courage & integrity |
| Business Practice | Honesty | Ethics |
| Future Focus | Mission | Vision |
| Diversity | Cultural tolerance | Global Citizenship |

Beyond Traditional Teaching

Traditional teaching did an adequate job of training individuals to work in manufacturing or management during the "industrial age". Technical institutions approached education like industrial assembly lines, memorise content, then proceed to the next course

Knowledge work has made memorisation obsolete. Finding new ways to solve problems doesn't permit rote answers. Today, in a post-industrial information age, repetitive training has gone the way of assembly lines, automated out of existence. In response, technical & higher education training programmes and curriculum are striving to produce this new generation of knowledge workers.

Learning is a Priority

Continuous learning will make the difference. It means organisations will need to put in place processes and systems that enable them to become learning organisations. Individuals will be encouraged to learn continuously and will be valued for their increasing competence. Team members will work together to share assumptions, learn through dialogue, build new mental approaches & actively transfer their knowledge to others. As a whole, a learning organisation will build the capability to create market opportunities and quickly capitalise on them in the pursuit of a common purpose.

Multi-Media Technology Improves Critical Thinking

"Multimedia" simply means information presented in a way that best communicates each aspect of the message. Still photos, technical drawings or illustrations can show such information as

construction details or test results. Advice from experts can be seen in live-action video footage. Charts & graphs can be animated in display their message more effectively.

In addition, multimedia offer the important value of user interaction. Learners can easily expose any given topic and work at their own pace. Each individual can speed through familiar tasks and devote more time to the new and unfamiliar.

People are most motivated to learn at the time they most need the information. The creativity provided by multimedia allows for programmes in which students can learn by doing. The multi-media tools coach the learner with immediate feedback on each decision and with information or expert advice at any point. Multi-media tools are not only excellent at helping individuals gain knowledge & skills, but they can be employed with equal advantage to team-based learning.

Technology Creates a New Learning Process

Technology can improve the teaching process. A computer monitor can become a classroom on the job. Multimedia tools prove that more the senses involved in the experience, the more complete the learning. Virtual reality, the next step in information technology, may provide the optimal means for realising the objectives of the experimental approach to learning.

Emerging technologies that recreate virtual environment will allow learners to immerse themselves in the learning experience through direct sensory perception. Virtual reality technology will allow learners to explore offices & laboratories and interact with tools, all without leaving their seats. Through advances in networking & communication technologies, virtual reality is no longer the stuff of science fiction.

Implementing Anderson Consulting Approach

Anderson Consulting is re-engineering its staff training approach to develop knowledge workers with deep specialisations who can work effectively in a team to reach common goals on their projects. The firm focuses on teaching employees the process of combining their skills and using all available resources to reach a challenging goal.

Teams consist of students with backgrounds in different areas and with a range of experience levels. Each team is given a project that is similar to the one they might encounter in reality in future. Together, they must then identify the challenges

at hand, agree on a common approach, carry out the required tasks and then evaluate the final result and their performance. Instructors act as coaches by encouraging students to use all available support tools and by guiding them through the process. They allow the students to discover their own solutions. Technology contributes to the richness of the learning environment by making available online interviews with firm experts & other resources. This convenient online access enables students to learn "just-in-time" to accomplish their goals.

This approach not only emphasises students' technical design skills, but also improves their time & resource management capabilities as well as reinforces team-based problem solving.

Concluding Implications

The liberalised economy has caused many operations to rightsize, downsize, re-engineer or re-organise in an effort to remain competitive. The growing emphasis on quality initiatives in general, and TQM in specific, require a baseline measurement programme in order to be effective. Added to this is the rate of technological change that is constantly accelerating, making improvement an ongoing challenge.

Hence technical institutions will have to build credibility for themselves, make their operations simple, efficient, cost-effective & meaningful like an efficient industrial enterprise. Technical education will have to be market-oriented. Institutions will be forced to market their facilities & capabilities so that students as clients (customers) would choose what they want on the basis of their tastes and needs. In order to relate education more and more to the world of work, structure and content of courses should be modified in such a way that on the one hand, reasonable specialised knowledge and skill is given, and on the other hand, students should be capable of doing work in other areas also for which related interdisciplinary courses should be provided.

Individual institutions would be the best judges to find out the areas needing re-engineering and reorganisation. Once the institution decides to take up each area and examines various aspects from different angles — of clients, customers, cost, time, relevance, overall impact etc, the need will become apparent and the way to go about it would also become clear.



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Extension as the Third Dimension of Higher Education : A Systems Study

Vivek Nagpal*

Introduction

Universities in India have greatly expanded their role and functions. The University Grants Commission (UGC) has recognised Extension as the third dimension of the institutions of higher education and considers it as important as teaching and research from the point of view of social usefulness and accountability. Presently more than 100 universities/deemed universities are involved in extension programmes. Centres/departments of adult and continuing education and extension have been established in several universities. These departments are expected to carry out literacy programmes, continuing education programmes, population education programmes, to extend support to NLM/State governments, NGOs for environment building, training, production of teaching/learning material, post literacy and continuing education etc to develop strong academic programme leading to degree, diploma or certificate and also to participate vigorously in the whole range of extension programmes for transferring the expertise and know how of the universities/colleges for the benefit of the local community.

The universities are implementing these programmes by fixing their own priorities. As a result, there are a lot of variations among the extension system of these universities with respect to organisational pattern, programmes conducted, clientele, evaluation etc. There is a need to study these variations and to know how the universities are conducting their extension function. Universities and other extension organisations may benefit from the experiences of each other.

As these departments are developing they are confronting many problems such as recognition of extension as the third function, relation of the department with other teaching departments, nature of the job of the faculty members, infrastructure for generation of suitable extension content and methodology, general organisation of the department etc. These problems need the attention of UGC and the concerned universities.

Therefore a scientific study of the extension systems of general universities can justifiably be considered a need. Although some studies of extension education systems of agricultural universities are available, there is practically no literature or research material about extension system of general universities. Hence the present study was planned with the following specific objectives :

- (i) to study the status of extension in general universities;
- (ii) to find out the organisational pattern of extension system of sampled universities;
- (iii) to find out variations in the programmes carried out by the departments/centres of adult and continuing education and extension;
- (iv) to elucidate different types of clientele of different extension programmes;
- (v) to know the methods employed for the evaluation of extension programmes; and
- (vi) to know the opinions of the heads/directors about the programmes and functioning of the departments/centers.

Methodology

A comprehensive questionnaire seeking information about status of extension, organisational pattern, programmes, clientele, evaluation methods etc was prepared. It had two parts—one to be filled up by heads/directors and the other to be filled up by any other faculty member of the department/centre. It was sent to three universities for pretesting and suitable alterations were made. The final questionnaire was mailed to 103 universities/deemed universities. Nine questionnaires were received in the first response. A reminder was sent after 30 days. Thereafter twelve more questionnaires were received. Fourteen questionnaires were received after second reminder. In all 37 questionnaires were returned from seventeen states and one union territory. This constitutes about thirty six per cent response. Information obtained was analysed and discussed vis-a-vis UGC's guidelines on adult and continuing education and extension programmes in universities and colleges

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and in accordance with the appropriate and accepted conceptual pattern of philosophy, objectives and programmes of extension education.

Salient Findings

The major findings of the study are asunder :

Status of Extension in Universities

i) Of the 37 universities, 18 universities have not so far recognised extension as a function.

ii) Most of the departments/centres/units under study were established during 1977 to 1987. During this period a total of 8 units, 11 centres and 10 departments were established.

iii) Twenty one of the thirty seven universities under study had extension departments while sixteen had extension centres, i.e. all the units have been converted either into departments or centres.

iv) The most common nomenclature found in use was Department/Centre of Adult and Continuing Education and Extension.

v) In about sixty five per cent universities directors/heads of the centres/departments of adult and continuing education and extension were not the members of the academic council.

vi) In about 45 per cent universities persons below the rank of professor/director or honorary director were heading the departments/centres.

vii) The heads/directors of 10 universities were not aware of specification of their powers by the UGC. More than 65 per cent universities have either not accepted UGC guidelines (regarding the powers of heads/directors) or have not yet delegated the powers to heads/directors of these departments/centres equivalent to the powers of heads of other departments of the university or respondents were not aware of their powers and responsibilities.

viii) Only ten of the thirty seven universities paid the salaries of the staff members of these departments/centres out of the maintenance budget of the university. Out of these 10 universities, five are the central universities.

ix) Almost all the universities paid the staff members according to the pay scales recommended by UGC.

x) In more than one third of universities the core staff members were not the members of teachers association i.e. they did not have the status equal to other faculty members.

xi) Thirty seven departments/centres under study had one hundred and sixty sanctioned positions of the level of Project Officer/lecturer and above i.e. on an average four faculty members per department/centre. About 40 per cent positions of Directors, more than 60 per cent positions of Readers and 40 per cent positions of lecturers were found vacant. Almost all the sanctioned posts of supporting staff were found in position.

xii) About two thirds of the extension departments/centres did not have the sanctioned position of even a peon. No position of technical assistant was provided in more than fifty per cent universities.

xiii) More than two thirds of universities did not possess any vehicle for extension work.

xiv) Most of the departments/centres had VCR and TV. Among other audio visual aids only overhead projector and tape recorders seemed to be popular.

Organisational Set-up

xv) The most popular model of organisational set-up was where the extension agency was either a department/centre. The head/director reported to Vice-Chancellor and Registrar both or the VC only. There was an advisory committee for planning and executing the extension activities. The departments/centres carried out only the extension function. Under the extension function all the three programmes of literacy, continuing education and population education were conducted. The university had affiliated colleges and they were also involved in the extension programmes.

xvi) In only ten universities the academic council governed the extension activities of the departments/centres.

xvii) In most of the universities the heads/directors reported to the VC on the extension activities undertaken. In few universities they reported to the Registrar.

xviii) Almost all the universities had an advisory body for planning and execution of extension activities. In twenty seven of the universities there was an Advisory Committee. In five universities this work was carried out by the Board of Studies. In three universities there were both the Advisory Committee as well as the Board of Studies.

xix) In only 60 per cent of the universities, the body for planning and execution of extension activities met regularly.

xx) More than eighty per cent of the universities involved the affiliated colleges in the extension programmes. Maximum number of colleges were involved in the programme of adult literacy.

xxi) In most of the universities, departments/centres of adult and continuing education and extension have been successful in involving other departments.

In all 29 and 61 faculties were involved regularly and occasionally respectively in 32 universities. Very few universities were obtaining cooperation from more than one faculty regularly. In only three universities there was full time involvement of staff members of the departments other than the department of adult and continuing education and extension.

xxii) Majority of the universities were found obtaining resource persons from outside the university and other departments of the university.

xxiii) The departments/centres were found involving many outside agencies/organisations in the extension work. Maximum involvement has been found with State Resource Centers.

xxiv) About thirty eight per cent of the universities provided one or more types of incentives to the students participating in extension activities. Of these more than 85 per cent provided academic incentives.

Programmes

xxv) Almost all the universities were carrying out the extension function. Twelve universities were carrying out all the three functions i.e. teaching, research and extension. Eight universities were performing dual functions i.e. either extension and teaching or extension or research while sixteen universities were involved in only extension function.

xxvi) Fifteen departments/centres offered twenty four teaching programmes in three subjects namely adult education, population education and extension education. Most common teaching programme was Diploma in Adult Education.

xxvii) About 50 per cent of the universities under study were found involved in research projects. These universities had completed 12 major research projects and 33 minor research projects so far.

xxviii) Almost all the universities were found involved in the literacy programme. More than 80 per cent of the universities were involved in the continuing education, population education programmes. Five universities were involved in the plan-

ning forum activities. Only three universities were carrying out other extension projects.

xxix) Out of the universities that provided the data regarding targets and achievements in literacy programme, three-fourths achieved the targets set for 1991-92 whereas only 40 per cent achieved three-fourths of the targets in the year 1992-93. The reason for this decline may be the change in the approach to literacy.

xxx) For eradication of illiteracy, three approaches namely total literacy campaign, mass programme of functional literacy and centre-based approach were being followed. Several universities have been following more than one approach. Thirty two universities were following total literacy campaign, 21 mass programme of functional literacy and 22 centre-based approach.

xxxi) Jan Shiksha Nilayams were allocated to 73 per cent of universities under study. Out of these 24 universities, only 21 had established JSNs. On an average each university established eight JSNs.

xxxii) Charcha mandal, post literacy, sports and adventure activities were found to be important activities of JSNs.

xxxiii) Out of the 37 universities under study twenty and sixteen universities conducted short-term training courses during the years 1991-92 and 1992-93 respectively. It was also found that the number of courses organised at university level reduced by 23 per cent and community level by 19 per cent during the year 1992-93. This may be due to the change in the financial inputs for these courses in the year 1992-93.

xxxiv) It was found that there was an increase in the number of population education clubs allocated and established during the years 1992-93 as compared to 1991-92.

Universities implementing the population education programme have performed better in establishing population education clubs at university level than at college level.

xxxv) Extension lectures and debates were the most common activities of population education clubs. Besides these essay writing at university level and group discussions at community level were found to be the most popular activities.

Clientele for Programmes

xxxvi) In literacy programme the universities were found paying more attention to women, sched-

uled castes and rural population. In population education programmes more attention was paid to rural, women and semi-urban population. In continuing education programme more importance was paid to rural and scheduled caste population. Based on the family roles more importance was paid to the housewives. The universities under study were found to be organising very few programmes for illiterates and professionals.

Evaluation

xxxvii) Annual report of UGC and the meetings of the department advisory committee were found to be the most common methods for evaluation of extension programmes.

Opinions of the Heads/Directors

xxxviii) Most of the heads/directors opined that the departments/centres should conduct all the three functions and that each of the faculty member should perform all the three functions. The weightage to extension teaching and research function should be in the ratio of 40:30:30 respectively.

xxxix) About 50 per cent of the heads/directors were not satisfied with their powers. The most common inadequacies reported were regarding administrative and financial powers.

xxxx) More than fifty per cent of the heads/directors were satisfied with the pattern of financial assistance for any of the programmes. The dissatisfaction was more conspicuous in case of financial assistance for other extension programmes for which no grant is provided by UGC.

As many as 90 per cent of the heads/directors expressed their dissatisfaction with this. About 70 per cent of respondents were also not satisfied with the financial assistance for continuing education course. The most common suggestions regarding the financial pattern were—(a) grants should be enhanced, (b) grants should be released well in time.

Suggestions for Action

(i) The study revealed that a majority of the universities have not recognised extension as a university function. UGC should impress upon these universities to recognise extension as a function by making suitable changes in their Acts and Statutes; for authorising administrative and financial powers to the heads/directors of these departments/centres equivalent to the heads of other departments of the university, for inclusion of the salaries of staff members in the maintenance grants and for governance of extension activities by academic council.

(ii) The heads/directors of the departments/centres should take suitable steps to try to make university environment conducive to extension. They should conduct activities for promoting wider and better understanding of extension concept, its theoretical framework, organisational characteristics and implementational framework among the academic community.

(iii) UGC and the Vice-Chancellors of the universities should pay attention towards strengthening these departments/centres particularly with respect to manpower and other resources required for conducting extension work.

(iv) The heads of the departments/centres must pay attention towards conducting regular meetings of the advisory bodies.

(v) UGC should enhance the grants for extension work particularly for continuing education programme. The departments/centres should also make efforts for obtaining grants from other sources and on conducting self financing programme.

(vi) More of such studies with considerable larger sample size and other methods of data collection (personal interviews with selected universities etc) would contribute much more to the existing knowledge of extension system of universities.

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Harnessing Varsities for Literacy

N.N. Prahallada*

"Development is for man, of man, all of man, whole of man, and what is concerned with the last man".

—Julius Nyerere

The economic advancement of a country largely depends on the development of 'human resource'. The socially and economically disadvantaged group of people in our country needs to be trained and educated into skilled manpower. India has a population of over 900 million, 37% live below the poverty line and 48% are illiterate. In order to develop such human resource it is very essential to promote literacy on a war footing.

The concept of Adult Education (AE) started in our country in the late 1930s with a focus on basic literacy in night schools for adults. In the 1950s the concept of basic literacy changed into civic literacy and further to functional literacy in 1960s with the introduction of Farmer's education and Functional literacy programmes etc. In 1978 the focus shifted with introduction of National Adult Education Programme (NAEP).

"In 1988 the National Literacy Mission (NLM) was launched and the subsequent emergence of Total Literacy Campaigns (TLCs) in different parts of India led to the formation of the concept of 'developmental literacy'. This included the components of self-reliance in basic literacy and numeracy, social awareness, acquisition of relevant skills and imbibing the values of national integration, conservation and protection of the environment and gender equity."

The concept of "Adult Education-Cum-Developmental Literacy" in our country has given rise to much discussion, speculation, and enquiry. One can see that there have been many conferences and debates on this concept and a large number of opinions and comments are pouring in.

Even after 50 years of independence we are unable to achieve the expected target in the area of Adult Education. What may be the reason and whom

should we blame for this state of affairs? In my opinion, it is due to the lack of interest and initiative on the part of the administrators, teachers, and to some extent students.

In our country, we have experts who can prepare very good schemes. The major drawback is in the implementation of programmes. Every one blows his trumpets on the platform, but when the question of implementation comes, they look to someone else to implement the programme. This is why we could not achieve the expected progress in Adult Education.

It should be noted that we cannot have real democracy, until and unless we have educated, enlightened citizens. We should inculcate social and political awareness among our adults especially in villages. Adult Education can play a vital role in this direction. We should plan our policies and programmes in such a manner that it should help in the upliftment of the rural and under-privileged people.

Adult Education should never confine itself to teaching of the three R's only but it should constitute literacy, dialogue and action. It should help adults improve their economic condition and living standards.

According to Lyman-Bryson, "adult education covers all the activities with an educational purpose on the part of the people engaged in the ordinary business of life. Purposeful efforts towards self-development carried on by an individual in all the three aspects of his life—his work, personal life and his contribution to society as a citizen constitute an essential ingredient of adult education."

Universities can play a major role in promoting adult education through its planned strategies. It can adopt a number of villages for spreading adult education. It is highly desirable that every university should have an adult education wing attached to it. Opportunities should be given to the students to meet villagers, study and help in solving their problems.

Proper mass media should be used to communicate and enlighten the village people about adult education and 'developmental literacy' programmes.

Universities may start correspondence courses, evening courses, vocational courses and summer institutes to stress the significance of adult education.

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Universities should take part in rural development schemes like Integrated Rural Development Programme (IRDP), Training for Rural youth for self employment (TRYSEM), Development of Women and Children in Rural Areas (DWCRA) and Total Literacy Campaigns (TLCs). Planned efforts should be made to give maximum possible coverage to the neo-literates. Universities should organise awareness camp-cum-training programmes in each and every taluka of their jurisdiction to generate awareness among the neo-literates about how to utilise the benefits under various government sponsored schemes.

Printed self-explanatory posters, booklets in simple language regarding government programmes, self-employment, rural development, sanitation and hygiene need to be prepared by universities for the benefit of neo-literates.

I suggest that every university in India should direct its teacher-training institutes to take up the task of promoting adult education in rural and urban areas

We can ask school teachers, students including NSS workers, village youth, ex-servicemen, volun-

tary and social workers to function as instructional agencies.

All state governments should evince keen interest in promoting the right type of adult education.

The press, the public and those who are in the profession should feel that it is their serious business to disseminate adult education. The concept of "Each one teach one" "Each one teach ten" and "Make the Home Literate", should be strictly practised. Further the fruits of adult education must reach the doors of every man howsoever poor in all villages.

If the universities were to take up the implementation of the adult education programmes seriously, we can definitely see phenomenal changes in the behaviour of our adults.

Lastly, for a complete success of any programme what is more important is the right type of co-operation. Therefore villagers must cooperate with the adult education workers in order to build up a new rural India with enlightened and responsible citizens.

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Strategies for Effective Generation and Management of Funds for Higher Education in Nigeria

M.A. Ogunu*

Introduction

The term higher education in the Nigerian context covers all forms of post-secondary education in Universities, Colleges of Education, and Polytechnics. For the purpose of this paper usage of the term will be restricted to education provided in the universities.

The objectives of higher education in Nigeria as specified in Section 32 of the National Policy on Education (1981) are as follows :

- the acquisition, development and inculcation of the proper value-orientation for the survival of the individual and society;
- the development of the intellectual capacities to understand and appreciate their environments;
- the acquisition of both physical and intellectual skills which will enable individuals to develop into useful members of the community; and
- the acquisition of an objective view of the local and external environments.

As noted by Ukeje (1986) it is stating the obvious to say that adequate funding of higher education is imperative for the realization of the primary objectives of higher education which include :

- production of effective and efficient high-level manpower for national development,
- development of self reliance and creativity,
- promotion of national unity,
- production of good citizens and productive individuals,
- inculcation of a healthy way of life, and
- the development of the ideals, skills and attitudes necessary and fundamental for the development and advancement of prosperous, free and peaceful nation.

Yet, as the noted economist, Okigbo (1990) rightly observed, "No one who studies the reports of the visitation panels (1975-1985) on the major universities

can fail to be struck by the constancy of the problems caused by inadequate funding, irregular rhythm of cash flows, inadequate administration and management of the funds as weak as of the university system and frequent allegations, of large scale frauds". He is not exaggerating as can be seen from the information on the recurrent grants received from the government by the federal universities from 1980-1990 as shown in Table 1.

Table 1 : Federal Universities' Appropriation Need and Allocation 1980-1990

| Year | Requested (a) | Nuc Reco (b) | Received (c) | Percentage (b/a) | Percentage (c/a) |
|---------|------------------|-----------------|-----------------|---------------------|---------------------|
| 1980/81 | 352 90 | 290 52 | 215 97 | 82 3 | 61 2 |
| 1981 | 508 56 | 343 51 | 321 91 | 67 5 | 63 3 |
| 1982 | 710.77 | 579 63 | 334.62 | 81 5 | 47 1 |
| 1983 | 767 52 | 634.53 | 371.47 | 82.7 | 48 4 |
| 1984 | 821.34 | 634 37 | 428 39 | 77.2 | 52.2 |
| 1985 | 694 61 | 446 02 | 421.90 | 64.2 | 60 7 |
| SAP1986 | 217 14 | 150 52 | 104 80 | 69 3 | 48 3 |
| 1987 | 176 16 | 125 99 | 65 15 | 71 5 | 36 9 |
| 1988 | 150.24 | 138 14 | 81 04 | 91 9 | 53 9 |
| 1989 | 139 07 | 102 05 | 66 29 | 73.4 | 47.7 |

NUC RECO: Recommended by National University Commission.
Source: Report of the Commission on the Review of Higher Education (1990: 107)

The Table indicates a wide gap between the amount requested for and the amount received by the federal universities. The difference ranges from 61.2 per cent to 36.9 per cent between 1980 and 1987. In 1989 the difference was 47.7 per cent. In other words, in most years, the actual recurrent grant allocations have very little relationship to the budget requests of the universities.

Adequate finance is the bed rock of any development. Without finance, management cannot plan or execute any worthwhile projects, buy new vehicles or refurbish old ones, provide hostel accommodation for its student population and provide decent and relatively well-furnished housing accommodation for its staff. Indeed the provision of facilities for teaching and learning, issues dealing with conditions of service, expansion of existing facilities and infrastructure, establishment of new institutions or departments have financial implications. Hence, constraints

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of funding coupled with irregular rhythm of cash flows make it difficult, if not impossible to plan effectively.

Given the reality of "chronic under-funding" in our institutions of higher education, it becomes imperative that alternative source of funding (other than government allocations) should be explored.

Strategies for Effective Generation of Funds

There are several external and internal alternative sources of generation of funds open to institutions of higher education as recommended by most of the committees and study groups set up to examine the problem (*Ogundeko Report, 1978, Cookey Report 1981, Fafunwa Report 1984; Longe Report 1991, Report of the Conference of Committee of Vice-Chancellors, 1991 and The World Bank Report No. 6920, 1987*). Among these (sources and strategies) are the following :

Payment of Tuition Fees

The Cookey Commission which was set up by the Federal Government to review the problems of higher education in Nigeria recommended that government should provide 80 per cent of the total annual recurrent expenditure of each university and that institutions should find the balance of 20 per cent from internal revenue generation efforts and other sources. Payment of tuition fees should be one of the internal sources of revenue generation. The amount of tuition charged should be reasonable and should depend on the subject, the level at which it is taught and the type of programme. For countries like Vietnam, Chile, Jordan and the Republic of Korea income from students' fees in public universities represents, 22 per cent, 36 per cent, 40 per cent and 46 per cent respectively of recurrent expenditures (*Onokerhoraye and Nwoye 1995*).

Business Ventures

Many institutions of higher education in Nigeria engage in such commercial ventures as running of bookshops and printing presses, publishing, real estate, transport services, petroleum products retailing, machines production, farming, hotels, catering and hospitality. Such practices should be continued and intensified where they already exist, and introduced where they are not yet available, provided they are productive. To bring efficiency and profitability into the ventures, private sector organisations should be encouraged to participate in equity holding and even in direct management.

Payment for University Services

Closely related to the above-named category of business ventures is payment for services provided by institutions to ensure smooth running and administration of academic services. Such services include

photocopying, fax, telex, audio-visual aids, phone and computer. The cost of providing these services can be reduced and at the same time some revenue can be generated if the services are operated as business. As pointed out by Blair (1992:33), it is relatively easy to determine the cost of the service and to levy an appropriate fee, as would be done by any private sector organisation providing similar services. The only difficulties in determining costs (for such services) will be in respect of security, metered telephone calls..... electricity, and water, (*Onokerhoraye and Nwoye, 1995, op.cit*). Institutions can however develop formulae for allocating such costs.

Consultancy Services

Institutions of higher learning have skills to sell. As recommended by Alele Williams (1991), authorities should mobilize such personnel with skills to procure funds for the institutions. Areas that can be exploited include engineering and technology, medical and paramedical skills, survey, computer, sciences, education, law, accountancy, mass communications, creative and musical arts and so on. The consultancy services in these disciplines should be thoroughly expanded, planned and managed to attract buyers. The staff who are engaged in such services could be given less teaching assignments and adequately remunerated to motivate them.

Alumni Association

The Longe Commission on Higher Education in the Nineties and Beyond note with regret that "Alumni associations for most of our higher institutions have not always been as useful as they could be."

There can be no doubt that the alumni, particularly those of the older institutions occupy positions of authority, influence and affluence which they could harness to help the development or maintenance of excellence in their alma mater. Efforts should be made to encourage them to contribute more effectively through endowments, research sponsorship and granting of scholarships and bursaries to students.

"The time has come" says Alele Williams (1991) "when revolutionary option of Alumni Association representation in major statutory organs of the university should be given serious thought". In pursuit of this objective, she cautioned, due care must be taken to ensure that only persons with distinguished record of committed and altruistic service to mankind in general and to the educational sector in particular, are enlisted into the hallowed grounds of our universities' council chambers.

Endowment Funds

Institutions of higher learning should organize

endowment funds. There exists a huge reservoir of untapped charity which the authorities in the institutions should identify, locate and exploit. The interests generated by the fund should be utilized for specific purposes such as research, repairs or maintenance of teaching equipment and so on.

Company Tax

In Nigeria, companies of various sizes are springing up and indeed maturing. Almost all of them declare heavy profits annually which is an indication of their economic viability. The companies can assist the government and people of this country by contributing towards the financing of higher education if possible in specific areas such as the training of technological manpower or professional groups and so on.

Recently the federal government approved 1¹/₂% company tax for Higher Education Fund to get all organizations fully involved in the educational development process. However, care should be taken to ensure that the nation does not suffer the experience of Tanzania where companies started to experience negative growth as a result of excessive taxation (Gwalabawa, 1991).

In the preceding section an attempt has been made to describe some innovative strategies which could be used to generate funds for institutions of higher learning in Nigeria.

While it is true that our institutions of higher learning suffer from chronic under-funding, it must be admitted that availability of funds without prudent management cannot lead the institutions and the nation forward in the path of progress. In view of the limited finance available to the institutions, the importance of efficient management of available funds cannot be overstated. In the following sections, five major strategies for effective management of funds in the institutions will be described.

Strategies for Effective Management of Funds

Onokerhoraye and Nwoye (1995) suggest the following measures, among others, as effective means of ensuring efficient management of financial resources in institutions of higher learning.

Competent, Experienced and Reliable Leadership

The Vice-Chancellor and his/her principal officers have a major role to play in the efficient management of financial resources in the universities. This suggests that the Vice-Chancellor and his key officers must be reliable managers who are professionally competent and vastly experienced in financial and administrative matters so as to be capable of designing and implementing budgetary and cost con-

trol measures as well as other financial mechanisms and procedures that would guarantee efficient management of funds and other resources of the university.

Sound and Reliable Accounting Systems

One of the most important components of any modern organization is a reliable and efficient accounting system. In view of inadequate resources coupled with the need to allocate available financial resources to competing demands, the establishment of well staffed accounting systems is mandatory in institutions of higher learning. "Such systems must have the appropriate books and records that would facilitate early checking and detection of fraud and all forms of abuse and waste. All members of staff connected with the handling of funds and the keeping of the accounting and other records should be thoroughly trained in their job and must be men and women of integrity and competence.

Internal and External Audit System

Closely related to the issue of a sound and reliable accounting system is that of an efficient internal and external audit system. The audit system should be fully equipped to effect both pre- and post expenditure auditing on a regular basis. The purpose of the pre-expenditure auditing is to ensure that all purchases are vital and that the price being paid for each item represents its true market value, while the post expenditure auditing is designed to ensure that the item in respect of which money has been advanced has actually been purchased and that it is of the right quality and description necessary for the purpose for which it was purchased. It is obvious for the above perception of the role of the audit department that its staffing should reflect not only professional accountants but technical staff in all areas of normal university expenditure. Within the framework of such a well and appropriately staffed audit department, it will be in a position to examine all the administrative functions, procedures and systems, besides the work of checking and detecting fraud and the appraisal of management accounting records and systems. To ensure effective control, it is necessary to have clearly defined responsibility and line of authority for dealing with all aspects of the institution's financial transactions including the processing of invoices, authorising of expenditure, signing of cheques, handling of cash, issuing of stock and all such similar functions. For effectiveness, the internal auditor should be directly responsible to the Chief Executive to whom he reports. Further more, the internal auditor should be in a position to survey the accounting, financial costing and other operations of

the institutions, subjecting them to very critical appraisal as to their effectiveness.

Budgeting and Budgetary Control

Budgeting is primarily concerned with the translation of financial resources into human purposes. It is generally an estimate or plan as to how money will be spent by an organization over a period of time in relation to the amount of money available. "While it can be said that Nigerian universities have effective budget preparation systems, the control and effective implementation of the budget... require improvements" (Onokerhoraye and Nwoye, *op. cit.*) A budget like any plan has little chance of success unless there is effort to monitor the progress. Monitoring involves following up an activity with the intention to assess progress, compare with initial plans and detect deviation, if any, from a planned programme and then take corrective measures.

The installation of effective budgetary control mechanisms in the management systems of higher educational institutions is a *sine qua non* because such control mechanisms make it possible for the executives in charge to control cost and revenues by comparing actual result with the approved budget estimates and then taking corrective action or measures whenever necessary. Thus where there is a deviation from the budgeted figures, questions would be raised and corrective action taken, if necessary (Irukwu, 1994 : 7).

Computerization of Administration

The declining availability of financial resources in Nigerian institutions of higher learning coupled with the need to reduce wastage in the area of staff employment where such staff are not necessary, highlights the need for these institutions to speed up the computerization process which is at present going on in them.

Surveys of the various universities by Blair and his research associates (1992) revealed that items of information were not readily available because their (universities') existing records were totally inadequate for an environment in which real financial management, cost centres and income generation were to operate. "Some institutions were almost totally unable to obtain from their records even relatively simpler data on their financial situation. In other words most universities in Nigeria do not have the financial information available to manage their institutions properly" (Blair, 1992 : 18).

The installation of a proven university computerized Management Information System (MIS) in each Nigerian university, the adaptation of existing

manual systems to the requirements of the computerized system, and the training of support staff, would provide universities with the basis from which to develop financially diversified sources of income and income generation activities, and allow them to operate the hoped-for financial compact with their governments. Without the rapid installation of such a system in each university, financial reform cannot succeed (Blair, 1992 : 17). There is need therefore to intensify the efforts being made so that at the beginning of the 21st century, all aspects of the management of Nigerian universities are computerized.

Conclusion

The paper has highlighted the crippling phenomenon of under-funding in institutions of higher learning in Nigeria and identified several strategies for effective generation and management of funds for the institutions. Education is the key that unlocks the door to modernization. To operate or develop at the desired level, institutions of higher learning in Nigeria must seek alternative means of financing their programmes and apply effective management strategies to manage the available funds efficiently, since government funds cannot support their needs.

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Academic Output and Market Demand

Dr. K. Kasturirangan, Chairman, Space Commission, Secretary, Department of Space and Chairman, Indian Space Research Organisation delivered the Convocation Address at the eighth convocation of Dr. B.R. Ambedkar Open University, Hyderabad. He said, "The conflict between availability and market demand still continues as a major issue primarily because of the lack of compatibility between the academic output and market demand, leading to unemployment and underemployment in some areas whereas certain sectors are affected by severe scarcity of required manpower. Also, the qualitative degeneration as an offshoot of certain critical defects in the academic systems is adding further complexities." Excerpts

The strive to understand the boundary of knowledge and the quest to look beyond to unearth the hidden facts, has been the faithful companion of humanity, in its growth of progress. The increasing demand on resources alongwith the basic instinct to improve the comfort, forced successive generations to use their intelligence and skill for an improved quality of life. In other words, the saga of human accomplishments not only narrates the story of man employing his physical strength for a better living, but also the progressive change in utilising the intellectual skills for transforming his life by interacting with the environment. The concept of humankind as the parasite on earth's resources, progressively changed to the realisation of humans as physical capital and today as 'manpower' developed out of the available human resources.

Manpower resources constitute a primary and essential input for a country's socio-economic development process. The goals of economic and social development can only be achieved if there exist adequate supplies of manpower with requisite education and skills. It is an accepted fact that the key to national prosperity, apart from

the spirit of the people, lies in the effective combination of the three factors: technology, raw materials and capital, primarily the human capital. This fact was well recognised by our nation, when it accepted the Scientific Policy Resolution in 1958, which stated : *"the wealth and prosperity of a nation depend on the effective utilisation of its human and material resources through industrialisation. The use of human material for industrialisation demands its education in science and training in technical skills ... India's enormous resources of manpower, can only become an asset in the modern world when trained and educated"*.

The catalytic role of education in improving the living standards of the people is an accepted fact. Least developed countries with literacy rates of 20-30 per cent have a national per capita gross income of less than US \$ 200 per year. On the other hand, in developed countries where the literacy rate is more than 95%, the average annual per capita GNP is US \$ 18000. Similarly an analysis of the female literacy, along with infant mortality rate, life expectancy and level of development also brings out the inevitable role of education in the overall development of a nation. For example, average number of

children per uneducated women in Brazil is 6.5, whereas women with secondary education have only 2.5. In Liberia, women who have been to secondary school are ten times more likely to use family planning services. Another study in 4 Latin American countries have shown that education was responsible for 40-60 per cent decline in birth rate. A recent study by International Food Policy Research Institute reveals that if men and women had education and access to agricultural inputs such as fertilizer and technologies, gains in agricultural output would be substantial. Even otherwise, considering the fact that 70 out of every 100 illiterates in underdeveloped countries are women, eradicating illiteracy contributes to women's liberation.

In India, education is considered as an integral part of the country's development process and thus has been accorded a high priority. Phenomenal expansion has taken place in the field of education, since independence. The successive national policies on education reiterated Government's commitment towards universalisation of education. The number of primary and upper primary schools increased from 220 thousand in 1950-51 to 730 thousand in 1993. A quarter million non-formal education centers also exist for school children and primary school drop outs. The total enrolment in 1993-94 in primary classes has crossed 100 million with another 40 million in upper primary classes as compared to less than 20 million in 1950-51. There has been significant growth in plan outlays on education too. The eighth plan outlay on education of Rs. 19,600 crores is 2.6 times that of seventh plan. The annual allocation by the Government of India on education in 1996-97 rose

to Rs. 3375 crores compared to 1875 crores in 1995-96.

The substantial increase in the numerical strength apart, there has been tremendous improvement in the quality and excellence. The country has not only been able to create excellent institutions of international repute, but also produce world-renowned academicians, engineers and technologists. Besides, considerable progress has been achieved in a number of high technology areas, cutting across disciplines ranging from agricultural & genetic engineering to electronics and super computers; and in a variety of themes starting from mining and construction, to atomic energy and space. For example, Indian accomplishments in Space technology development and utilisation are widely acclaimed and India is considered as one of the front-ranking space-faring nations of the world.

While we have made considerable progress in identifying and developing the human resources, how far we have succeeded in realising the objectives of the scientific policy of 1958, which stated that one of the aims was *"to encourage and initiate with all possible speed, programmes for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in science and education, agriculture and industry and defense?"* For a great country like India, with its traditions of scholarship and original thinking and its great cultural heritage and having a population of more than 900 million, there cannot be a scarcity of manpower, if the available human resources are properly assessed, efficiently developed and optimally utilised. The number of scientists, engineers and technicians per thousand population in Canada, Japan and Sweden is 180.66, 112.77 and 113.63 respectively. The corre-

sponding figure in India is 3.76. The conflict between availability and market demand still continues as a major issue primarily because of the lack of compatibility between the academic output and market demand, leading to unemployment and underemployment in some areas whereas certain sectors are affected by severe scarcity of required manpower. Also, the qualitative degeneration as an offshoot of certain critical defects in the academic systems is adding further complexities.

As the famous scientist Carl Sagan, said *"we live in an extraordinary age. These are times of stunning changes in social organisation, economic well-being, moral and ethical precepts, philosophical and religious perspectives and human self-knowledge as well as in our understanding of that vast universe in which we are imbedded like a grain of sand in a cosmic ocean."* Between 1917 and 1950, countries containing one third of the world's population seceded from the market economy and launched an experiment in constructing an alternative economic system. A massive effort was made to centralise control of production and allocate all resources through state planning. This vast equipment transformed the political and the economic map of the world and set the course of much of the twentieth century. Today, the limitations of the very same system, have set in motion just as radical a transformation, as these same countries change course, seeking to rebuild markets and reintegrate themselves into the world economy. Today, most of the economies have rejected all or much of central planning and have embarked on a passage — a transition — towards decentralised market mechanisms underpinned by widespread private ownership. Not all follow the same path. Despite common features, the mass

of centrally planned economies was far from monolithic. It was composed of countries with different histories, cultures and resource endowments. Whereas political change towards multiparty democracy was a prime-objective in the post-1989 reforms in Central and Eastern Europe (CEE) and the Newly Independent States (NIS) of the former Soviet Union, neither China which initiated economic reforms in 1978 nor Vietnam has experienced a political transition away from governments patterned on the earlier concepts. There is thus tremendous variety in the departure point, strategies and outcomes of transition, across the countries.

The era of liberalisation, globalisation as well as stabilisation and the transition towards an integrated world offers tremendous opportunities coupled with formidable challenges. The ongoing transition is not simply the adoption or modification of a few policies or programmes but a passage from one mode of economic organisation to a vastly different one. The underlying habits and rules of an economic system are often so pervasive and ingrained that they are taken for granted. Transition often unleashed a complex process of creation, adaptation and destruction. Old institutions and organisations evolve, or are replaced, requiring new skills and attitudes. Also, in the transition economies the magnitudes are exceptionally greater. For example, transition economies have privatised more than 30,000 large and medium-size enterprises in five years. In the eleven years between 1980 and 1991, the rest of the world privatised fewer than 7,000.

The challenges related to manpower planning are two fold in this context : meeting the requirements to explore and exploit the

opportunities available in the global market in an integrated world and catering to the national requirements in tune with the wind of transition initiated in our own country. The global opportunities are so vast and indeterministic that how much we can exploit with the national capability and capacity is the question. It will be worthwhile to identify certain areas of national eminence and international competence and prioritise the targeted markets and segments which will be in consonance with the current scenario. This will in turn enable us to identify the manpower needs and hence the challenges towards arriving at a plan of action.

The inevitable role of modern communication technologies in fulfilling the task ahead in the educational sector is well reflected in the National Policy on Education (NPE). It states : *"modern communication technologies have the potential to bypass several stages and sequences in the process of development encountered in early decades. Both the constraints of time and distance at once become manageable. In order to avoid structural dualism, modern educational technology must reach out to the most distant areas and the most deprived sections of beneficiaries simultaneously with the areas of comparative affluence and ready availability."* It is quite natural for a country with 900 million people on 329 mha area, speaking over 50 major regional languages and representing almost all the religions of the world to adopt this strategy as it is the only means to meet the national goals in a cost-effective and timely manner. This is further compounded by the problem of illiteracy, which is 47.8% as per 1991 census and will be a major challenge as we enter the 21st century.

Recognising the immense potential of satellites as a medium for mass communication and educa-

tion, particularly in the rural areas, India embarked on a planned programme in the seventies. Satellite Instructional Television Experiment programme (SITE), considered as the biggest ever exercise of this kind anywhere in the world, involving 2400 villages in six Indian States, was successfully conducted using NASA's ATS-6 satellite in 1975-76. Careful preparation of programmes tailored to the profiles of SITE village audience and pretesting them to evaluate audience reaction for their comprehension, utility and entertainment preceded the actual audio-visual transmission. Using the vast amount of folklore, mythological backdrop and the rich cultural heritage in the form of dances and folk songs as background material, messages of social value were projected to the audience. Special efforts were made to produce science programmes to make children realise that science permeates their everyday activities. The year long programme which ended in August 1976, conclusively established the efficacy of the audio-visual medium for enhancing education, in the shortest time possible to remote rural areas, in health, hygiene, family planning and better agricultural practices.

The success of SITE led to the establishment of the operational multipurpose Indian National Satellite System viz., INSAT in the early eighties. INSAT system with its four operational satellites presently, provides telecommunications, broadcasting and meteorological services. These satellites will be augmented by INSAT-2E in middle 1998. The satellite television component consists of eighteen TV channels which include national and regional language services. These are rebroadcast through the terrestrial TV transmitters. Cable operators also distribute them through cable. The

terrestrial TV network consists of over 750 transmitters covering 85% of population and 68% of area. INSAT is being used to provide Educational TV (ETV) Service for primary school children in selected three-district clusters in the six States of Andhra Pradesh, Orissa, Maharashtra, Gujarat, Bihar and Uttar Pradesh. Separate programmes for primary school children in the age group of 4 to 8 years and 9 to 11 years are telecast. The ETV programmes are targeted for rural schools where TV brings the teaching aids which are otherwise unavailable or scarce, to the class rooms. Programmes for the guidance/training of primary school teachers are also telecast. Programme production infrastructure for TV programmes for primary education has been created through Central Institutes for Educational Technology (CIET) and six State Institutes for Educational Technology (SIETs).

Realising the need to impart periodic training to various sectors of the society, we have embarked upon a scheme of further experimentation and demonstration in distance education using satellites for development. Training of the primary school teachers, village level workers or extension workers, adult literacy activists or volunteers and retraining of industrial workers are the three target groups which were selected. Since such training of trainers have to be interactive, a two-way audio and one-way video system was evolved. The trainers or village level workers already have a wealth of information that they could share with each other and it is necessary that the medium enables this. Hence, the interaction is not only between the lecturer and students, but also amongst the students. The basic system consists of a teaching end, a model classroom with the teaching aids such as

blackboard, video recorders and personal computer terminal. This classroom is located close to a satellite earth station which is again configured to be as simple and inexpensive as possible. At the end of a lecture or a demonstration, the persons assembled at the distant classrooms could ask questions to the resource person at the teaching end and obtain clarifications. Convinced of the need to have an operational system, a Training and Development Communication Channel (TDCC) was earmarked on INSAT in 1995. A number of experiments for adult education activists, industrial workers, State Bank employees, employees of Panchayat Raj Institutions, etc, have emphatically demonstrated the system viability.

Community education for better resource management is yet another area where space systems have emphatically proved their worthiness. Industrialisation driven by wasteful human consumption patterns in the developed countries has resulted in promoting a totally unsustainable way of living and has aggravated poverty elsewhere by creating large imbalances in livelihood of different regions. Achieving sustainable development will require not only substantial improvement in the production but also adjustments in the consumption pattern and optimal use of resources linked to the carrying capacity of the land. This in turn demands the adoption of appropriate agricultural practices taking into account the nature of terrain, soil type, availability of water resources, etc, particularly in the developing countries. Space offers viable technological options to arrive at as well as to reach these information to the concerned sectors of the society.

To demonstrate the efficacy of a satellite based development communication and training net-

work for rural development a Pilot Project viz., Jhabua Development Communications Project (JDCP) is being carried out in the Jhabua District of Madhya Pradesh for a period of two years. The regular transmissions have started on November 1, 1996. This end-to-end Project would demonstrate the effectiveness of the communications support to the developmental activities in the District and also in providing interactive training to the field officials and the people in general. It will also provide inputs for planning and establishing of operational systems on a wider scale in the country.

JDCP and TDCC are only the beginning. Apart from increase in the utilisation of these networks and their replication, newer and innovative technologies are being experimented with by ISRO to make them more effective and responsive to meet the varied requirements of information services. Introduction of digital technologies is a must. The costs of digital equipment based on MPEG-2 compression technologies are coming down. The multi-media technologies are coming to package knowledge into an integrated audio/visual/text/graphics formats using computers. Internet

and intranet technologies are fast emerging. towards this ISRO is utilising the flight opportunities on the first developmental flight of GSLV to experiment and demonstrate new technologies meeting the requirements of the future.

The GSAT-1 satellite scheduled for launch on the first developmental flight of India's Geo-stationary Satellite Launch Vehicle (GSLV) carries two high powered (46 dBW) S-band transponders. Under GSAT-1 Applications Project (GAP-1), ISRO is working on demonstrating digital audio and data broadcast services, multiple digital TV channels via a transponder and a hybrid-internet system which is based on low speed dial-up line and high speed satellite broadcast.

Each transponder of GSAT-1 can support 4 to 8 compressed digital TV channels depending on the quality. Alternatively, each transponder can also support 48 audio channels at 16 Kbps or 8 CD quality channels to small portable receivers. Since bent-pipe transponders are used, the satellite is transparent to other modulation techniques. Availability of such a large number of channels is expected to revolutionise the radio broadcasting scenario in the coun-

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try. Apart from the channels of general nature, introducing dedicated channels for news, sports, different types of music, business information, development communications, etc, are also feasible. Broadcast of curriculum based audio lectures for students of distance education and school children is expected to be a major usage. The digital nature of the signal is also envisaged to provide a host of data broadcast services. These include dissemination of lecture notes to students of Open Universities, distribution of electronic newspapers, broadcast of information by utility agencies, down loading large volumes of internet data, etc

In an era of inevitable compulsions from an exponentially growing population for better quality of life and an expanding national economy that needs to adapt itself to a changing world of economic liberalisation and global integration, development of the available

human capital into valuable resources for the empowerment of the nation is a formidable challenge. As Dr. Ambedkar said, "The object of primary education is to see that every child that enters the portals of a primary school does leave it only at a stage when it becomes literate and continues to be literate throughout the rest of his life." Learning is a continuous process by which one strives not only to improve his intellectual faculties, but also to realise the transformation towards complete manhood, in a continuous process of enrichment. I am happy to see a cross-section of the Indian populace who has realised this reality and reached the successful culmination of yet another phase in their life. With the change in concept of education as an investment in human capital with the aim of not only the generation of manpower, but manhood, the challenges ahead are daunting and formidable. While

you continue to enrich your knowledge you also have the onerous responsibility of sharing this knowledge with the less privileged and the needy in our society, thereby creating a multiplier effort, which I am sure can only make a strong, vibrant and prosperous India of the 21st century. As the great Czech educationist Comenius stated 350 years ago, "Our first wish is that all men should be educated to full humanity; not any one individual, nor a few nor even many, but all men together and single, young and old, rich and poor, of high and lowly birth, men and women — in a word all those whose fate it is to be born human beings; so that at last the whole of the human race may become educated, men of all ages, all conditions, both sexes and all nations. Our second wish is that every man should be wholly educated, rightly formed not only in one single matter or in a few or even in many but in all things which affect human nature."

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शोध एवं आलोचना साहित्य

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|---|-----------------------|--------------|--------------|--------|
| यशपाल जीवन दर्शन एवं साहित्य | डॉ उमा मिहता | शोध | प्रथम 1998 | 195 00 |
| उपन्यासकार भगवतीचरण वर्मा | डॉ ब्रज नारायण सिंह | आलोचना | द्वितीय 1998 | 125 00 |
| सपक बोली सरल कैसे बनाए | महेस्वर प्रसाद | भाषा विज्ञान | प्रथम 1998 | 40 00 |
| भारतीय व्यक्ति विशेष | भगवतसरण उपाध्याय | कोश | तृतीय 1997 | 150 00 |
| निर्गुण कविधियों के सामाजिक आदर्श | डॉ विमला मेहता | शोध | द्वितीय 1997 | 120 00 |
| महादेवी का विम्वचोध | डॉ सन्तोष शर्मा | शोध | तृतीय 1997 | 150 00 |
| और प्रतीक सृजन | | | | |
| ऐतिहासिक रीति कविधियों का काव्य-शिल्प | डॉ महेन्द्र कुमार | शोध | द्वितीय 1997 | 350 00 |
| हिन्दी कहानी-साहित्य में प्रेम एवं | डॉ देव कानुनिया | शोध | द्वितीय 1996 | 190 00 |
| सीन्दूर तत्व का निरूपण | | | | |
| मिराला के काव्य का शैली | डॉ वेदवत शर्मा | शोध | तृतीय 1996 | 250 00 |
| वैज्ञानिक अध्ययन | | | | |
| मिराला का गद्य साहित्य | डॉ निर्मल जिन्दल | शोध | 1997 | 240 00 |
| विहारी सतसई में नायिका वर्णन | डॉ अरुणा अंबोल | आलोचना | द्वितीय 1997 | 60 00 |
| नरेश मेहता कृत महाप्रस्थान | डॉ विष्णु प्रभा शर्मा | आलोचना | द्वितीय 1997 | 50 00 |
| दिल्ली ग्रामीण क्षेत्र के लोक गीतों का अध्ययन | डॉ सुरत सिंह गहलोत | लोक-साहित्य | प्रथम 1996 | 250 00 |
| हिन्दी गद्य-साहित्य में | | | | |
| अलंकार खोजना | डॉ ओम प्रकाश शर्मा | शोध | द्वितीय 1996 | 160 00 |
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| मिराला के काव्य-विम्व | डॉ वेदवत शर्मा | आलोचना | द्वितीय 1997 | 60 00 |
| और प्रतीक | | | | |
| हिन्दी काव्य में भक्ति का स्वरूप | डॉ किशनन्द शर्मा | शोध | द्वितीय 1997 | 140 00 |

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| कच्ची मिट्टी के लोग | विजया गोयल | कहानी | प्रथम 1996 | 50 00 |
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| | | सबसे नए | | |
| ललित एकांकी | डॉ राम कुमार वर्मा | एकांकी | द्वितीय 1996 | 50.00 |
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| जंगल की अद्भुत घटनाएं | राजा यादवेन्द्र दुबे | सामान्य ज्ञान | प्रथम 1996 | 35 00 |

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CAMPUS NEWS

85th Indian Science Congress—A Report

The 85th session of the Indian Science Congress was recently organised at the Osmania University campus in Hyderabad. Inaugurating the Congress, Prime Minister Mr. I.K. Gujral lauded the achievements of Indian scientists over the last fifty years in the face of all odds.

"Despite technology embargoes and denials by foreign countries, India has made big strides in the fields of atomic energy, space and defence. We converted every denial into opportunity," he said.

Referring to his visit to the defence and research development organisation laboratories, the Prime Minister said, "The more I saw, the more proud I felt. Young scientists are contributing so much to our growth. The proudest moment of my life was to see our satellite being launched," he said.

The Prime Minister appealed to Indian scientists to make a greater contribution in solving the daily problems of the common people, including the supply of clean drinking water and increasing productivity of food grains.

Mr. Gujral called on the scientists to solve the problem of drinking water supply, increasing agriculture productivity, and helping in the adult and female literacy.

The Prime Minister also underlined the need for better intellectual property management and said there were many ideas in educational institutions and the laboratories which should be patented.

"It is necessary to promote IPR culture. To this end we need to have a number of scientists, engi-

neers, teachers and lawyers to answer the needs of the IPR regime."

Stressing the importance of protecting India's interest in matters of intellectual property rights, the Prime Minister said the Government had sanctioned money to set up a modern patent office.

The Government was taking various other steps to make a career in science attractive for students.

The Prime Minister said Indian industry still had a long way to go before it becomes globally competitive. It was therefore necessary to harness the advances of technology to propel the growth of our industry, he said.

Mr. Gujral said a new award would be instituted for those who promote and inculcate the scientific temperament among people, particularly the children.

He hinted that the National Science Talent Search Scheme would be revived soon to attract young and talented students towards science education. The government had also set up a Technology Development Board to stimulate such efforts through part-funding. Industry was showing keen interest in using these opportunities, he said.

Referring to the expertise of Indian scientists, researchers and entrepreneurs in the field of information technology, the Prime Minister said India should be able to get a four to five per cent share in the world market in software rather than the present one per cent.

The tools of information tech-

nology should be utilised for spreading the scientific temperament among people, policy-makers, politicians and administrators.

In his address, the union minister of state for science and technology, Mr. Y.K. Alagh, said that in the last five decades, one of the great achievements of Indian science has been the sustenance of the technological base of Indian agricultural growth. Scientists have released 1,125 varieties of cereal crops, 406 pulse varieties and 641 varieties of oil seeds, fibre and fodder crops, he said.

Prof. Alagh did not agree with the criticism that India's research and development expenditure was low and her scientific performance had deteriorated. He said that scattered evidence suggested that, in fact, small enterprises spent more on research and innovations and for development of new products while big companies "import technology for the so called white products and make profits from that without adaptation."

Andhra Pradesh Governor Mr. C. Rangarajan said between one-third and a half of the growth in industrially advanced countries had come from technological progress. "Technology thus remains the principal driving force for long-term economic growth," he said. He also called for the need to harness science and technology to answer India's myriad social and economic problems.

A.P. chief minister Mr. Chandrababu Naidu said that 90 per cent of the world's R and D is confined to the industrially developed countries. Of this, 60 per cent

is military-oriented. In this context, it is important for India with such a large human capital to progress more rapidly.

Prof. P. Rama Rao, in his presidential address said while the world was spending \$500 billion annually on R&D, India was spending merely \$2.5 billion per annum. Only 15 per cent of this was going towards basic research.

Despite low investment, the country had made great strides in science and technology, he said. There was a need to increase allocation for research and development activity in the country. At least five per cent of the total plan outlay of the socio-economic ministries should be allocated for science and technology related activities, without putting additional burden on the exchequer.

During the 8th Plan, Rs. 360 billion was spent on R&D out of which 67 per cent came from central government, nine per cent from the states, and 24 per cent from the public and private sector industry, he said.

Calling for a new approach to science and technology in the country, Prof. Rama Rao called for the minimum investment of two per cent of the GNP in it by the end of the 9th Plan. Even this investment would be less than the 2.5 to 3 per cent made by leading industrialised countries, he pointed out. An increase in investment would help India recover lost time and opportunity.

Touching on the subject of weak infrastructure facilities for R&D work at universities, Prof. Rao urged for immediate selection of at least one university in every state for strengthening research infrastructure and skills.

Prof. Rao rued the fact that there was no system for science

and technology investments in the economic ministries as was prevalent in the Defence Ministry. Stating that national security does not lie just in defence, he called for the development of economy-related production technologies.

On this occasion the Prime Minister presented the various awards instituted by the Indian Science Congress Association. The award winners included Prof. Roald Hoffman, Nobel Laureate from the Cornell University, Ithaca, US, who got the Jawaharlal Nehru Birth Centenary Award, and Prof. Yash Pal, who bagged the Ashutosh Mookherjee Memorial Award.

The other award winners were: Prof. Satish Dhawan (Vikram Ambalal Sarabai Centenary Award), Dr. A. Ramachandran (S.S. Bhatnagar Memorial Award), Prof. R.C. Mehrotra (P.C. Ray Memorial Award), Dr. S. K. Joshi (M.N. Saha Birth Centenary Award), Prof. R. Narasimha (Srinivasa Ramanujam Birth Centenary Award), Prof. J.V. Narlikar (C.V. Raman Birth Centenary Award), Prof. G. Padmanabhan (J.C. Bose Memorial Award), Dr. Jayanta Kumar Ghosh (P.C. Mahalanobis Birth Centenary Award), Dr. V.S. Arunachalam (D.S. Kothari Memorial Award), Dr. M.R. Srinivasan (H.J. Bhabha Memorial Award), and Dr. M.S. Swaminathan (B.P. Paul Memorial Award).

Collaborations and Partnerships

Speakers at the second plenary session of the Congress warned that Indian science, as also the world in general, would not be able to enter the 21st century of its dream unless the government, national research laboratories, universities and industries join hands and concentrate on innovations.

Addressing a galaxy of scien-

tists, students and entrepreneurs at Osmania University, Chancellor of the University of California, USA, Prof. MRC Greenwood said Indian science was advancing by leaps and bounds, but, cautioned that future development of the third largest pool of scientific manpower could be attained only by partnerships.

"Collaborations, partnerships and combined efforts of government, universities and industry have been responsible for the success of the US in the field of science.

Knowledge is the key to the future and no nation would have the knowledge to enter the 21st century in the absence of joint ventures and a solid scientific policy," she said.

Elaborating on the American Science Policy, Greenwood said substantial government funding for fundamental research was guiding the US to new scientific frontiers. "In the US," she said, "government is the engine, partnerships the vehicle and education the constant energy supplier."

The US government's approach to science is directional, not directive. The partnerships link science to economic development and science education from primary school to postgraduation was reaping rich benefits, she observed.

Underscoring the relevance of universities in scientific advancement, Vice-Chancellor of the University of California, Prof. CKN Patel said universities would not be able to survive by the turn of the century if they do not gear themselves up to become the creators of wealth for the nation.

He noted that though search for knowledge had always been the driving factor behind achieve-

ments in science, various factors contributed to it during various stages of world history.

If the urge to know was the only factor during the pre-World War period, post World War scenario of science was upbeat with government funds flooding it.

The post-Cold War era saw the decrease in investment in defence-based scientific research. Notably, though the industry developed in a big way, there was a drop in industry based research, he said.

Stating that social expectations were changing, Prof. Patel said that as against the old way of research works spanning 20 years, the present demands had made it mandatory that a particular research work be completed within five years.

"With the rapidly changing scenario world over, the questions to be uppermost in our minds should be that how much research is enough and how much the society could afford."

The Chairman of the U.S. House of Representatives' Committee on Science, Mr. F. James Sensenbrenner, made it clear that the U.S. tax payers would not tolerate it, if scientific collaborations with other countries were based only on foreign policy considerations.

He said: "We cannot risk making scientific cooperation vulnerable to accusations that it is just another type of foreign aid. We must guard against creating the perception in the minds of the tax paying public that international science is foreign aid. Foreign aid continues to be politically unpopular and linking it to funding for science will not advance our cause."

Elaborating on the theme, he

emphasised that it was imperative that all parties involved in large multinational scientific projects must remain vigilant on behalf of their own interests, and in this context cited the agreement with regard to the Large Hadron Collider project located at the European Council for Particle Physics in Geneva, Switzerland, in which India was also a collaborator, along with the U.S. and 22 other countries. Pressure had to be mounted to modify the preliminary agreement as it did not provide for open access to the CERN facilities to all scientists, and there was no protection of non-European interests in the event of cost overruns, including a funding cap, besides lack of good faith, reciprocity by CERN and its participants on contributions to the next high energy physics facility, if and when it is built anywhere in the world, and inappropriate management role for non-Europeans, he said.

Plea for Organic Chemistry

Nobel Prize winner for chemistry Prof. Roald Hoffman asked Indian scientists to give more importance to organic chemistry.

Delivering a lecture at the B.M. Birla Science Centre Prof. Hoffman said studies on organic chemistry in India were not satisfactory and the subject should be given a thrust. Developments in the field would prove beneficial to the pharmaceutical industry, he noted.

Terming science as a double-edged weapon with both constructive and destructive powers, he said scientists should never forget ethics. Science does not always cater to materialistic needs, it has a spiritual side too. "Look at the structure of certain molecules and see how beautiful they are. Science is an art in itself," he said.

On molecular beauty, Prof.

Hoffman said some molecules were beautiful by their symmetry and those ugly in appearance did beautiful things to mankind. "There are molecules of various shapes — cubical, quadrangular, pyramidal and some resembling a soccer ball. The colourful view of a haemoglobin molecule is splendid," he said.

Later Prof. Hoffman gave away the B.M. Birla Science Prizes for the year 1994 and 1995 to young Indian scientists. The awardees are : Dipendra Prasad (Mathematics), Mehta Research Institute, Allahabad; S. Yashonath (Chemistry), Super Computer Education and Research Centre, Indian Institute of Science, Bangalore; A Srikrishna (Chemistry), Indian Institute of Science, Bangalore; Prof. Ashoke Sen (Physics), Mehta Research Institute, Allahabad; Shahid Jameel (Biology), International Centre for Genetic Engineering and Biotechnology.

S & T and Indian Industry

The Chairman of ICI Limited and a member of the Scientific Advisory Committee to the Cabinet, Dr. Ashok Ganguly, regretted that the various issues relating to the use of S & T for tapping the vast opportunities for the Indian industry, particularly the food processing sector, had still not been addressed properly.

He said the time was already over-due to find ways and means to modernise both the people and the institutions in the S & T sectors. There was particularly a need to create conditions to upgrade at least some universities to world class standards and for heavy investment in R & D in key sectors of the industry.

India, he said, must learn from other countries. In the developed world, already the traditional barriers between academic research

and industrial R&D were breaking down and collaboration between Government, academia, and the industry was creating holistic advantages and raising their national competitiveness.

In India also, there was a need to create a network of various resources, driven by clearly defined business goals and this was the responsibility of the industry, and not the Government. "The message is very clear — invest and invest even more massively in S & T institutions, and industrial and agricultural R & D to generate wealth," he said.

He further emphasised that both demand and curiosity driven S & T were necessary, as while the former led to generation of national wealth, the latter resulted in new knowledge. One without the other would have diminishing value. They have to be orchestrated properly.

He called for greater thrust towards R & D in the agricultural sector, on the ground that it would be critical for India's sustainable development and said the S & T related problems that required urgent attention included soil erosion and degradation, overuse of chemicals, loss of grain storage and transit, over-dependence on monsoon and under-investment in water management, and underestimation of the role of plant biotechnology in India's quantum leap into a new ecologically sustainable agricultural orbit

Women and Science

Dr. Manju Sharma, Secretary, Department of Biotechnology, presenting a paper at the forum on women and science, called upon women entrepreneurs to focus more on ventures based on developments in biotechnology, particularly in areas of agriculture and

medicine and said they could particularly invest in areas like tissue, cut flowers, mushroom cultivation, vermiculture, food processing and preservation and integrated fish and poultry farming, where advanced technologies were already available and where there was a big market waiting to be tapped. She also urged for greater involvement of women in bio-technology R&D and, in this context, recalled estimates that biotechnology and genetic engineering would account for 40 per cent of the global industrial scenario in the next century. "Whether we talk of food items, enhancing agriculture productivity, use of biological software such as biofertilizers and biopesticide, the need to intensify research in bioscience would be of utmost priority. I do not see any reason why women scientists and technologists, who favour joining biosciences to other areas of science, cannot contribute in a big way in this endeavour," she added.

Addressing the women delegates, Mr. P.D. Gupta of the Institute of Chemical Technology said that the sexual differences were built in physiologically and the process starts even before the development of the brain of the foetus. Despite the common myth, women were no way inferior to men in any aspect and the sexual differences have historically developed for the purpose of division of labour, he said.

Participating in the poster session, Malathi Duraisamy of the Indian Institute of Technology, Chennai observed that women had to wait for a longer time than men for securing jobs. In her study on the gender disparity in employment and earnings among the science and technology persons in the country, she concluded that on an average women earn about 20

per cent less than men and the disparities were caused by the dissimilarity in the field of specialisation.

In her paper, 'Role of Indian women in the scientific scenario,' K. Jaya of the department of Botany claimed that women constituted a microscopic minority despite their exemplary role in the field of science. Apart from the opposition from family members, barriers also existed due to the professional world where masculine ethics of bureaucracy forced women to achieve feminine goals related to family.

Inclusion of science and technology for women in the Sixth Five Year Plan marked the recognition of women as an integral part of the national development, observed Parampreet Kaur of the Cytogenetics and Tissue Culture Laboratory of the Osmania University.

Education and Science

Universities should maintain a healthy balance between the emerging specialisations in education to cater to the demands of current technological advancements, said Prof. M.S. Ananth of the Indian Institute of Technology, Chennai.

Participating in the symposium on Engineering Education at the 85th Indian Science Congress, Prof. Anant said these institutions should educate students to help cope with the confusion of values following technologies that threaten to sweep humanity off its cultural feet.

He said the liberalisation policy had changed the outlook of the government towards the role of the educational institutions vis-a-vis industry.

The new economic policy expected the institutes of higher

learning to modify their role to assist Indian industry go global. The revised pattern of funding for the educational institutions emphasised on revenue generation as a prelude towards the grant of effective administration and functional autonomy, he noted.

According to him the stress was on encouraging long term financial and developmental planning for freeing education from governmental interference.

He felt that the curriculum at undergraduate and postgraduate levels should focus on teaching the students so as to enable them to keep pace with the rapidly changing technologies.

He admitted that the government funding had decreased for higher education and research work was becoming an expensive undertaking.

Increasing consumerism and the information explosion had simultaneously raised the levels of accountability, he added.

Energy Issues

There was a need for popularising the natural lighting and heating concepts in the country, said Ms. Leena Srivastava of the Tata Energy Research Institute. She was participating in the symposium, "Energy — the dominant infrastructure" as part of the 85th Indian Science Congress. She said that these concepts should be made part of the architectural courses for long-term energy saving measures.

Responding to a question that the issue of global warming could just be a false alarm since there was no corresponding increase in the surface temperature, she said more evidence was pouring in about the Green House Effect resulting in discernible impact on climate change.

Though the issue has some uncertainty, the measures initiated were precautionary in nature, she said.

In his presentation, Mr. A.P. Rao, general manager of the corporate R&D division of the Bharat Heavy Electricals Limited called upon the research institutions, industries and universities to come together and focus on the country's requirements and evolve programmes for implementation of new technologies

The environmental regulations and the non-availability of natural gas for power generators would influence a great deal the emerging power generation technologies, he said.

Even the need for achieving higher plant efficiencies using high ash Indian coal and other fuels would contribute in this direction, he said.

Science and Environment

Prof J Bandyopadhyay, professor in environmental sciences, Geneva, called upon Indian scientists to address politically sensitive matters regarding science and environment through creation of interdisciplinary knowledge.

Speaking at the seventh plenary session of the Science Congress, Prof Bandyopadhyay said scientists were generally hesitant to take up policy issues regarding science and environment, thereby resulting in an "unhealthy" trend of NGOs and media taking the lead. "Media and NGOs are not technically qualified to make statements and influence government decisions regarding science. But, with scientists shying away from such issues, media and NGOs are playing a prominent role. But they have only relief measures to suggest, not remedies" he said.

"What had the scientists done when the Silent Valley project in Kerala threatened the existence of lion-tailed monkeys there?" he asked. Citing the health hazard of arsenic contamination of drinking water in East India and Bangladesh, he said the West Bengal government had taken up a project to purify drinking water at an exorbitant cost.

"Neither did the government seek the expertise of a geochemist to unravel the mystery of arsenic content in the water, nor did scientists form a core group to find it out," he observed.

Elaborating on what he called eco-fundamentalism, he said there was a fundamental dichotomy between nature and modern science.

"Eco-fundamentalists look at modern science as reductionary and future as holistic. There should be an alternative agenda from the ecological view point which could transform reductionist disciplinary knowledge into a holistic interdisciplinary one "

Prof Bandyopadhyay, a specialist in montology, said mountains were being ignored by the scientific fraternity, though 10 per cent of the world population lived on mountains and 40 per cent were dependent on them. About 60 per cent of the utilised fresh water originate from mountains, which occupy 33 per cent of the total terrestrial surface of earth.

Dr. R. Gadagkar, chairman Centre for Ecological Sciences, Indian Institute of Science, aired a similar grievance that his field of study, entomology was not being given adequate attention. Though insects constitute the largest number of species in the animal kingdom, their study was not getting enough thrust, he said.

Buttressing his point, Dr. Gadagkar said it was astounding that though small in size, insects constituted almost 75 per cent of the total biomass on earth. Insects constituted 71.6 per cent of described Indian species, while mammals were a mere 0.4 per cent. India, though having a mega-diversity in ecology, was not promoting study of insects, he said.

Prof. James Gardner, pro-Vice-Chancellor University of Manitoba, Canada made a valid point observing that the last three days of the Science Congress had deliberated much on environmental problems and less on solutions. There was a serious imbalance between consumption of natural resources and their replenishment, he said, adding that scientists were speaking about sustainability from a narrow perspective.

"If one goes by the biological calendar, Homo sapiens appeared on the face of earth only the other day. It is from the point of human view that sustainability is being discussed, taking into consideration only the last one million years into account, when the actual geological age is more than five billion years," he noted.

He felt that there should be better understanding of geo-science which would give formal knowledge on resource management.

Over 5000 delegates comprising national and international scientists participated in the 5-day deliberations of the Congress.

The 86th Indian Science Congress will be held at the Anna University in Chennai next year with the focal theme "New Bio-sciences: Opportunities and Challenges."

Dr. Manju Sharma, Secretary, Department of Bio-Technology,

Govt. of India, was elected General President of the 86th session of the Congress, to be held in 1999.

National Seminar on Culture and Psychology

The Department of Psychology, University of Delhi recently organised a National Seminar on "Culture and Psychology". Eminent social scientists and professionals from allied disciplines, artists and writers participated in the Seminar. The deliberations focused on the nature and significance of the relationship between culture and aspects of human psyche as approached by the different human sciences in respective disciplinary traditions.

Prof. G. Misra, Seminar Director, in his introductory remarks drew attention to the need for a dialogue and close interaction across different disciplines. He highlighted the significance of culture in psychological sciences. Prof. Andre Beteille examined the boundaries of anthropological, sociological, and psychological discourses. He viewed culture in terms of organized pattern of ideas, beliefs and values largely involving the evaluative aspect of the collective social life. He noted that anthropology had shown enormous degree of variation across cultures. He analyzed the inter-disciplinary challenges in grappling with the issue of culture vis-a-vis human action. He noted that the Indian culture had always been reflective, and in spite of globalization, cultural variety will continue in future.

Prof. D. Sinha, delivered the Platinum Jubilee lecture on "Culture from a Cross-Cultural Psychological Perspective". He dwelt on the psychologists' tryst with culture as it had grown in the field of cross cultural psychology in an historical perspective. He indi-

cated that while culture and psyche both were intimately linked, "culture" for a long time could not find a proper place in the mainstream discourses in the psychological science. It was suggested that the dominance of Euro-American meta-theoretical frame of reference led to a constrained vision of the discipline which was reinforced and legitimised by the positivist methodology. Hence within the mainstream psychology, the cultural embeddedness of psychological discourse was kept at a periphery. He argued that the 'culture blind' and 'culture bound' aspects of psychology needed to be challenged as culture formed an integral part of the human psyche and its behavioural manifestations.

The role of culture in human cognition was explored by Prof. G.C. Gupta. He reflected on the nature of the process of 'culture-in making' and examined autopoiesis or the process of self making which reflects a systemic self regulative approach to the study of cognition and culture. Prof. A.K. Sinha examined the prototypical contrasts in the conceptualization of 'time' in Indian and Western cultures, which provided one way of understanding culture. Prof. Uday Jain analyzed the historical and current social processes shaping the identity of the native community at an interior village of British Columbia in Canada. A historical perspective on the interface between psychology and culture was discussed by Dr. Lila Krishnan. She focused upon the changes in the field of psychology over the last three decades with the inclusion of the "cultural component", specifically within the well known branches of "cross-cultural" and "cultural" psychologies. Prof. Janak Pandey schematized the various approaches to examine the

relationship between culture and psychology along two dimensions namely emphasis on cultural context and emphasis on commonalties in human experience. Dr. Suneet Varma indicated that the discipline of psychology should broaden its perspective by adopting an interpretive stance—one which allows for the reading of culture as a “process” and not as a nominal variable used to categorize groups. Prof. L.B. Tripathi cautioned that overemphasis on looking for diversity in cultural forms had sidetracked the essential unity inherent in the diversities of psychological phenomena, thereby hindering the development of a “universal” psychology. Cultural appropriateness of psychotherapeutic intervention was emphasized, and its implications were examined by Prof. Haripad Mishra, Prof. Veeraraghavan, Prof. Ashum Gupta and Prof. Aruna Broota

Prof. J.S. Neki, a psychiatrist, noted that what Freud said did not apply to all of us. The Oedipus myth is not universal. The meanings of love and sexuality are culture specific. He viewed two aspects of libido. Libido sensualist and libido affectionalist. The former had the properties of object seeking, had choice and capacity to discriminate. Sexual libido was concerned with race propagation and affectional libido was object sustaining. He hypothesized harmonal/neural bases of libidinal activity. He referred to the findings that ablation of temporal lobe produced hypersexuality while ablation of frontal lobe led to the neglect of the offspring. He felt very strongly that the two streams of libido were picked up from different cultures. Prof. Neki remarked that in Indian setting human life was shared. This had implications for therapy and treatment for mental disorders. He

drew attention to the syntax of the cultural medium. Giving examples from linguistic usage he indicated the possible differences in the structure of mind across cultures. Drawing from his experiences with mental patients in different cultures Prof. Neki illustrated the significance of culture in clinical work. For him culture meant a design for living which was intimately linked with mental functioning. He noted certain specific ego defence mechanisms used in India such as Karmic ascription, deceptive humility, projective extroversion and kinship incorporation. He remarked that culture had important implications for health and disease in all aspects.

One session was devoted towards understanding the role of culture in shaping human development. Ms. Bhanumati Sharma examined the way culture was used in the researches in the area of child development. Dr. Bonnie Kanner emphasized that meaning of ‘development’ and its end points were culturally embedded and warned about the possible pitfalls in adopting concepts and methodologies developed in alien cultures. Prof. Michael Mascolo focused on the dynamic construction of culture, social relation, and self. Instead of viewing individuals or cultures as independent forms, he stressed the mutual interplay among biological, personal, dyadic and cultural systems and illustrated it through an analysis of dynamic construction of self evaluative emotion (e.g., pride) in North American culture.

In another session an eminent psycho-analyst Prof. Sudhir Kakar initiated a discussion on psycho-analytic perspective on the interface between culture and psyche. The discussion highlighted how psychic and behavioural manifes-

tations were culture specific and how certain perspective could neither be taken for granted nor could be damned for its origin but had to be rigorously demonstrated across different cultures. He remarked that the pain of nearness, in the Indian context would largely be preferred to the coldness of distance. He said that the Indian way of thinking is context-sensitive. To him cultural psychology provided a refuge for the restlessness felt in his psychoanalytic endeavour. The inner world comprised of mental representations of culture, he observed. It was a system of reverberating world of one’s cultural experiences and traditions and consisted of living past, he added.

As a part of the seminar a symposium was organized around the theme of cultural influences on organizational behaviour and designing organizations. Prof. R.C. Tripathi introduced the theme of the symposium and asserted that designing organizations in the Indian socio-cultural milieu required a comprehensive understanding of social values, and the cultural matrix of Indianness. Prof. J.B.P. Sinha, made a presentation based on the empirical work pertaining to the Indian social values prevalent in organizations and provided a comparative analysis with Western values. He asserted that Indian values of harmony and tolerance, group embeddedness, hierarchical concerns, dependence and personalized relationship orientation were gradually being relegated to a backseat and values like achievement, ability utilization and actualization were gaining currency with Indian managers.

Shri Yognand Sinha expressed his serious doubt as to whether we really understood the Indianness of the Indian organizations. He as-

serted that generally Indianness was understood only with reference to some contrast i.e., non Indianness or Westernness. The point of reference lay at somewhere else. We tended to create polar categories. Such an approach was fraught with serious deficiencies as far as the understanding of Indianness was concerned. Prof. Rajen Gupta articulated that organizations ought to be conceived or designed as a new kind of human groups. According to him, organizations ought to be conceived or designed as a new kind of human groups. According to him, organizations were colonizing the life of an individual, and there was a need to discover new methodologies to study the interface of culture and organization. Prof. J.K. Mitra suggested that Indian organizations were not facilitative of creating structures and documenting each and every aspect of their functioning. Prof. Anand Prakash argued that social values understood by survey techniques failed to provide a complete understanding of cultural complexities of Indian organizations. The main reason lay in problems of locating the context of organizational boundaries. Prof. R.C. Tripathi, said that Indian organizations needed to rediscover the goals and mission in the cultural processes of India.

In the session exploring the linkages of culture and mind, an attempt was made to sketch the contours of Indian identity. Shri Ashok Vajpeyie pointed out that the essential problem was that many of us no longer had residency in a particular language; i.e., we had a fragmented world view shaped by different linguistic systems for cognitions/intellection (English) and everyday life (e.g. Hindi) wherein it was difficult to locate an authentic Indian self. Shri Nirmal Verma, an eminent Hindi

writer, felt that the strength of the Indian self lay in its connections with others as well as the divine order, in stark contrast to the lonely and lost individual self in the West which had largely severed the external ties and interconnections. Prof. Wageesh Shukla emphasised the notion of culture as construction of the mind as conceptualized in the Yogic system of thought. He noted that the true nature of self could only be experienced by purging the mind and emptying it from the illusion called culture. Prof. T.K.V. Subramaniam gave an overview of the current trends in history vis-a-vis culture and raised the question of "Who's culture"? He pointed out that what was referred to as culture at a given time in history represented the view of those in power. He thus emphasised the need for a hermeneutical approach to understanding cultural artefacts as well as texts situated in specific historical contexts. Dr. Rabindra Ray, a noted sociologist, in his presentation, reflected on the dilemmas of Indian self-definition. He pointed out the ambivalence of West and East about themselves as well as about each other and how a search for an Indian self definition was marked by a back-forth movement between a definition cast on a western mould and a westernised sanskritic tradition.

Prof. T.N. Madan examined the notion of culture from the viewpoint of an anthropologist. He noted that while anthropologists emphasised cultural relativity, psychologists conceptualised the psyche in terms of universal principles applicable to all people. He gave examples from different cultures which challenged this notion of a universal psyche.

Dr. Kapila Vatsayayan, in her concluding address, gave a call to reconstruct the human scientific

approach towards culture which could overcome the fragmentation felt across different disciplines which focused on understanding culture. In her opinion, a fundamental paradigmatic shift was warranted which may encompass different levels of consciousness as well as its various manifestations across time and space.

GJU Faculty Development Programme

Working in industry for at least a fortnight once in two years will become mandatory for all teachers of Guru Jambheshwar University. As part of a programme for faculty development, it has been recommended that courses on change management and communication skills be organised for all teachers of the university. The suggestions are reported to have been made by a committee constituted by the Vice-Chancellor to plan measures to update the skills of teachers.

The committee has observed that it would be necessary to create an attitudinal change in the teachers to enable them to adjust themselves to their new environment in view of the international competition in the field of higher education.

The first course was recently held on "management of change". The other topics for workshops to be held include effective use of teaching aids, use of information technology and development of communication skills.

The Vice-Chancellor, Dr K.L. Johar, said that there was an urgent need to orient teachers for the challenging job of providing higher education in a manner that it was tuned to the needs of the industry and business.

Dr Johar said the university had decided to take up faculty de-

velopment programmes in the right earnest and all teachers on the campus as also those working in affiliated colleges would be motivated to participate.

To enable teachers to have first-hand experience of the work culture and job requirements in the industry, it has been recommended that every teacher should work for at least 15 days in an industrial house or business organisation relevant to his respective discipline. The teacher would be treated as being on duty during this period.

Nanocrystals for Wide Use

Scientists at the Anna University, Chennai are reported to have prepared nanocrystals, or crystals of size one-billionth of a metre, that are one of the frontier areas of global research today.

A team headed by Mr. S. Ramasamy prepared crystals about 10 nanometres in size of several compounds that include zinc oxide, zirconia, barium titanate and lead zirconia titanate under a project funded by the Department of Science and Technology. (A nanometre is ten raised to the power of minus nine metres.) These tiny crystals can be assembled to form 'nanostructured' materials with wide-ranging applications.

The nanostructured forms of metals, alloys, ceramics and composites are harder and tougher and have improved magnetic properties compared to conventional materials, Mr. Ramasamy said at a symposium on nanostructured materials held in Hyderabad. Mr. Ramasamy said these materials could be used in solid state batteries.

The team planned to investigate potential use of nanostructured materials in medicine,

as culture media to grow microorganisms, and as odour sensors, Mr. Ramasamy reported.

An indigenous chamber would be installed at the department of nuclear physics at Anna University in March this year, Mr. Ramasamy said.

Moot Court Competition

Law students excelled the professionals while presenting their arguments at the moot court, observed Justice Y. Bhaskar Rao of Karnataka High Court at the valedictory function of the national level moot court competition organised by the University Law College in Bangalore recently.

Moot courts inculcated professionalism among students even before they entered the Bar, he said. The topic at the moot court, *Professional Misconduct by an Advocate*, was very interesting when the conduct of advocates was in limelight, he added.

Five sitting judges from the High Court of Karnataka — Justices Y. Bhaskar Rao, T.S. Thakur, Chandrashekharaiah, H.L. Dattu and V. Gopala Gowda — were on the panel of the moot court to hear the arguments of the students and deliver judgment.

The team comprising Mr P.K. Prabhat and Ms Reeba Elizabeth Chacko of National Law School of India University (NLSIU), Bangalore, emerged winners in the finals while Mr Gerald Manoharan and Ms Kavery Bopanna of the University Law College (ULC), Bangalore, were the runners-up. Ms Reeba Elizabeth Chacko was adjudged best student advocate and best lady advocate and Mr P.K. Prabhat, second best student advocate and best gentleman advocate. The NLSIU bagged first prize for memorials while Campus Law Centre, Delhi, came second.

Twenty teams from all over the country participated in the competition, said ULC Principal Prof. V.B. Cutinho in his welcome address. He said moot courts helped the students in the future career to a large extent.

Sanjay Gandhi PGI Convocation

"What India needs at the moment, is renaissance — social, political, economical and cultural to lead the world and regain the status of 'Guru', the world leader which she really was at one time," said Dr Karan Singh, Member of Rajya Sabha on the occasion of the 3rd convocation of Sanjay Gandhi Post Graduate Institute of Medical Sciences held in Lucknow recently. He said that in the country the moral and social values were getting eroded to a great extent. Crime and corruption were replacing the harmony and honesty in each and every sphere of life.

"Ironically, we have developed a tendency to expect hard results with the soft options which is no more possible," he observed adding, "we require concentration, dedication, devotion and determination to get the hard results and then only we would be able to give a proper direction to the entire world."

Laced with the *shlokas* from the Vedas, he started his that revolved around the basic principle that healthy mind rests in a healthy body.

Laying stress on the various dimensions of health Dr Singh said that the goal at present should be to achieve holistic health and then only a holistic society could be developed.

Outlining the importance of physical, emotional, psychological and spiritual aspects of human health, Dr. Karan Singh said that

in view of the ever increasing consumerism, criminalisation, commercialisation and urbanisation of the society, one had to be physically fit, psychologically and emotionally strong and sound, mentally balanced and above all spiritually centered.

He said that along with all the technical advancements in the field of medical and other sciences, one should ponder over these extra-scientific aspects and principles to live a better life.

Speaking on the occasion, Governor Mr. Romesh Bhandari expressed his discontent and dismay over the irregular scheduling of the admissions, sessions, examinations, declaration of results and the convocations in the different universities of the state.

DPEP National Research Programme

Under the National Research Component (NRC), the District Primary Education Programme, sponsored by the Govt. of India, (DPEP) announces two schemes, PROMOTE (Promoting Individual Research in Primary Education) and INSPIRE (Institutional Projects in Primary Education). Research studies pertaining to identified areas will be sponsored through these schemes.

PROMOTE scheme is for promoting research in elementary education by established individual research scholars from national educational institutions, universities, reputed non-government institutions and established freelance researchers with proven expertise and experience. Under INSPIRE scheme, Research Studies by institutions & universities will be promoted. Institutions having interest and experience in conducting research in education, socio-economic or other develop-

mental issues will be given preference. In order to avail support under PROMOTE and/or INSPIRE, individual researchers and institutions have to first submit a Concept Paper on the research theme.

Further details of the priority areas identified, schemes, their applicability, financial limits, etc may be obtained from the Research Evaluation and Studies Unit, Ed. CIL's Technical Support Group, A-264, Defence Colony, New Delhi-110 024.

Science Popularisation Award

Dr. B.C. Deb Memorial Award for popularisation of Science for 1997-98 was presented to science writer and communicator Dr. Naresh Chand Jain. The award, carrying a cash prize of Rs. 5,000 and the citation was presented to Dr. Jain by Dr. Stephan Hill, Director of UNESCO, Jakarta.

Recipient of the Chemline Award for 1994 for science writing on Indian themes and the Raizada Award 1992 for Young Information scientist of the Society for Information Science, Dr. Naresh Jain is actively involved in popularising the science through various media including newspapers and radios.

Dr. Jain, Assistant Director-General of Indian Council of Medical Research, Delhi, in his lecture

on "strategies of enhancing indigenous science coverage in the communication media", called for setting up a science media centre to provide feed and information to science writers and journalists and to encourage more people to write on science subjects and popularise science.

He said writers should also be aware of the fact that writing on science was not a social service but quite lucrative and paying job and there were number of awards instituted for them.

Rathindra Puraskar

Prof. U.R. Rao, Member, Space Commission and Dr. Vikram Sarabhai, former Chairman of the Space Commission and Secretary, Department of Space, have been awarded the prestigious Rathindra Puraskar for 1996 by the Visva-Baharati University, Shantiniketan. The award is in recognition of their significant contribution to the application of science for public welfare.

The award was instituted to perpetuate the memory of late Rathindranath Tagore, eldest son of Rabindranath Tagore. The award comprises a citation and a cash award of Rs. 15,000.

We Congratulate....

Dr. Radharaman Chakrabarti who has been appointed Vice-Chancellor of the Netaji Subhas Open University, Calcutta.

News from Agricultural Universities

TANUVAS Research & Training Centre

Dr. S. Shanmugasundaram, Vice-Chancellor, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), stressed the

need for taking the results of the research activities from the laboratory to the general public, the end beneficiaries. He was speak-

ing at a function to declare open the new premises of the University's research and training centre at Ramayanpatti village near Tirunelveli constructed at a cost of Rs. nine lakhs from the funds provided by the District Rural Development Agency (DRDA). He pointed out cattle was second behind agriculture in building up the economy of the country and it also provided constant revenue to the farmers.

He said the strength of the bulls, particularly the special breed like Kangeyam bulls, had gone down alarmingly in the country, causing much concern to the farming community in general and the scientists in particular. The cattle played a key role in the food production in the country and its depleted strength was expected to affect the food production in future.

Dr. Shanmugasundaram said the milk production in the country had increased enormously in the recent past, thanks to the research undertaken in this field by the scientists. However, the per individual consumption of milk had not increased, due to the spurt in the population. Country cows would not help much in increasing milk production, he said and advocated cross breeding of cows.

Dr. R. Manickam, Director, Centre for Animal Health Science, TANUVAS, in his presidential address pointed out the University was running 16 research and training centres in various parts of the State, including one in Namakkal exclusively for poultry. He said the training imparted in the centres, helped farmers to take up self-employment.

He pointed out the Ramayanpatti research centre played a key role in diagnosing the Blue Tongue

disease, which affected the sheep population recently in the southern districts and minimising the loss to the farmers to a considerable extent.

He said the University has

proposed to develop the Ramayanpatti centre as a model goat farm and also impart specialised training to the farmers in this field. He urged the farmers to take full advantage of the centre.

News from UGC

Countrywide Classroom Programme

Between 15th and 21st February, 1998 the following schedule of telecast on higher education through INSAT-1D under the auspices of the University Grants Commission will be observed. The programmes are telecast on the Doordarshan's National Network from 7.15 to 8.00 a.m. every day except on Saturdays & Sundays. These programmes are also telecast on Doordarshan's National Network from 6 00 to 7.00 a.m. four days a week i.e. on Tuesdays, Thursdays, Saturdays and Sundays. On DD2 University Video Lecture Courses will be shown at midnight between 0000-0030 hrs. and in the morning between 10-10.30 a.m. on Monday through Friday.

Hindi Programmes are being telecast on Mondays, Wednesdays & Fridays from 6 00 to 6.30 a.m.

15.2.98

"Kuchamani Khayal — Its Characters Costumes & Make-up"

"The Art of Stamp Designing"

"Wind Surfing"

UVLC

No Telecast

16.2.98

"Little Knowledge is a Dangerous Thing-1"

"Tragedy-1 : Aristotle to Brecht"

"Recent Trends in Psychological Disorders — Child Depression"

"Bertrand Russell : A Champion of Rationality"

"Understanding Hotel Industry"

UVLC

"Religion and Philosophy of the Upanishada and Gita"

"Nervous System and Neural Integration-2"

17.2.98

"Metallurgical Marvels of India — Making of Wootz, Steel & Fabrication of Iron Pillar-2"

"Sculptural Heritage of Kanchipuram"

"Towards Better Health : Mosquito Control"

"Sacred Groves : The Rare Island of Greenery"

"Tragedy-2 : Aristotle to Brecht"

"Oxygen-1 : Oxygen and Life"

"Metro : Calculating the Impredictable"

"How Indian is English-1"

UVLC

"Sociological theory"

"Elementary Integration and Applications-10"

18.2.98

"Hibiscus Rosa Sinensis"

"Tragedy-3 : Aristotle to Brecht"

"Paleo Climate-1 : A Global Perspective"

"The Hindu Temple Sikhara-1"

"Gene Bank for Medicinal & Aromatic Plants"

UVLC

"Principles of Design"

"Currents of the Ocean-1"

19.2.98

"The Pipliya Meteorite : A Blow from the Heaven"

"Integral Pedagogy Process-3 : Experience"

"Women in Victorian Literature — The New Women in Late Victorian Fiction"

"Question Time-54"

"Foot Prints in Crime Investigation"

"Tragedy-4 : Aristotle to Brecht"

"Computer Networks-2"

"Armenians of Calcutta"

"Communication : Television — A Window on the World"

UVLC

"Salient Features of the Constitution of the Indian Republic"

"Subsidies-1"

20.2.98

"Weave your Life Through Khadi"

"The Life of William Shakespeare"

"Jazz-1"

"Prints & Print Making"

"Designing a Product"

UVLC

"Decision Making"

"Divisible Profits-2"

21.2.98

"Fibonacci Numbers-1"

"Schizophrenia"

"The War Harmonies"

UVLC

No Telecast

Hindi Telecast

प्रारंभ: 6.00 से 6.30 बजे तक

16.2.98

"नेहरू युवा संगठन : एक दृष्टि, एक लोग"

18.2.98

"एकदूषकवर : एक चिकित्सा पद्धति-2"

20.2.98

"आर्ट आफ स्क्रीन प्रिंटिंग"

News from Abroad

World Conference on Higher Education

UNESCO proposes to organise a World Conference on Higher Education in Paris on 28 September-2nd October, 1998. The theme of the conference is "Higher Education in the Twenty First Century." Its aim will be to lay down fundamental principles for the in-depth reform of higher education systems throughout the world with a view to strengthening their contribution to development and to the building of peace. Likewise, the formulation of proposals concerning higher education and the tasks assigned to it will need to take account of the fact that peace, development and democracy are inseparable, and of the principles contained in the Universal Declaration of Human Rights, notably those of equity and merit (Article 26.1)

The Conference will be preceded by a series of regional consultations and complementary meetings to ensure dialogue with all relevant partners.

The Conference will involve a broad range of actors : national policy-makers, institutional leaders, the professoriate and researchers, the student community, the economic and professional sectors, IGOs, NGOs, agencies of the UN system and numerous groups in civil society. All these have a vested interest in higher education for personal, professional and socio-economic development.

The debate will be focused on three major themes : Quality; Pertinence; and International Co-operation.

The related issues include : Higher Education, Sustainable Human Development and Peace; Academic Freedom and Institutional Autonomy; Higher Education Governance, Management and Staff Development; The Financing of Higher Education; Access to Higher Education; Women in Higher Education; Students and Society; Higher Education and the World of Work; Diversification of Higher Education; The contribution of Higher Education to the whole Education System; Communication and Information Technologies in Higher Education; Research and Higher Education; and Higher Education and Cultural Development.

The formulation of a declaration and of a comprehensive worldwide plan of action is foreseen in order to stimulate the renewal of higher education and to propose a new university pact guided by three watchwords : quality, relevance and international co-operation.

Three major outcomes are expected from the Conference : wider access, based on the principle of merit, to higher education systems, their enhanced management and the reinforcement of their links with society, notably through their contribution to the definition of new partnerships between higher education institutions and their communities. This includes linkages to the world of work so that qualifications become more suited to its requirements. Thus, the reforms proposed should be adapted to the specific needs of different regions and countries.

Further details may be obtained from the Director, Division of Higher Education UNESCO, 7, Place de Fontenoy, 75352 Paris 07 SP/1, rue Miollis, 75732 Paris Cedex 15.

International Business — German-US Degree Program

The School of International Business of the Reutlingen University has introduced the Degree Program INTERNATIONAL BUSINESS (IB) from the winter semester 1997/98. The four-year program leads to the simultaneous award of the German degree "Diplom-Betriebswirt (FH)" and the American degree "Master of Business Administration". This has been made possible by new funding allocated by the German Federal Ministry of Education and Research to create special international programs.

International Business (IB) is an international program that covers all fields of a business administration degree. All aspects of business administration are dealt with from the viewpoint of companies operating on an international level. By combining rigorous academic standards with extensive exposure to the practical business world, the program aims to provide students with an international education that will prepare them in an optimal way for a subsequent career in international companies and organizations.

The distinguishing characteristic of the International Business (IB) program is its international dimension. Students spend three years of study at Reutlingen University and the fourth year at one of the American partner universities Southeastern Louisiana University or Portland State University. The program includes two internship semesters, of which at least one must be completed outside Germany. The international dimension of the program is also determined by the fact that half of the students admitted to this program come from all over the

world.

The basic objective of the internship semesters is to provide practical experience and knowledge in various fields of operation in the corporate world. The internships also give the students the opportunity to carry out specific practical tasks as independently as possible. During the internships students remain fully registered students at Reutlingen University. Students who have already completed an apprenticeship and have practical work experience can be exempt from the first internship. Students

who have already obtained a Bachelor's degree in a business related field may be exempt from the first year of study.

The overriding concern of the program International Business (IB) is to provide an education in management that combines the advantages of the American business schools with the strengths of a German university education.

Further details can be obtained from the School of International Business, Reutlingen University, Alteburgstrabe 150, D-72762 Reutlingen, Germany.



Indira Gandhi National Open University

Schedule of Telecast for the period 1st to 31st March, 1998
6.30 a.m. to 7.00 a.m.

| Day/Date | Academic Prog. | Title |
|----------------------|------------------------------|---|
| 2.3.98 Monday | Bachelor's Degree Programme | Police Public Relationship |
| 4.3.98 Wednesday | Diploma & Certificate Course | Tools and Ideas Pt I |
| 6.3.98 Friday | Management | Probability Applications |
| 9.3.98 Monday | Bachelor's Degree Programme | Natyanuvad Prastuti Ki Samasyayen |
| 11.3.98 Wednesday | Diploma & Certificate Course | Tools and Ideas Pt. II |
| 13.3.98 Friday | Management | Technology Acquisition - Indian Experience |
| 16.3.98 Monday | Bachelor's Degree Programme | Setting up a Food service Establishment — An NGO Experience |
| 18.3.98 Wednesday | Diploma & Certificate Course | Views on Reporting — Mark Tully |
| 20.3.98 Friday | Management | Planning & Control of Project |
| 23.3.98 Monday | Bachelor's Degree Programme | Bhojan Pariveshan Sanshtha Chalana — Ek Anubhav |
| 25.3.98 Wednesday | Diploma & Certificate Course | A Writer and Political Commitment Ngugi wa Thiongo's |
| 27.3.98 Friday | Management | Marketing approach |
| 30.3.98 Monday | Bachelor's Degree Programme | Sociological Theory and Methodology |

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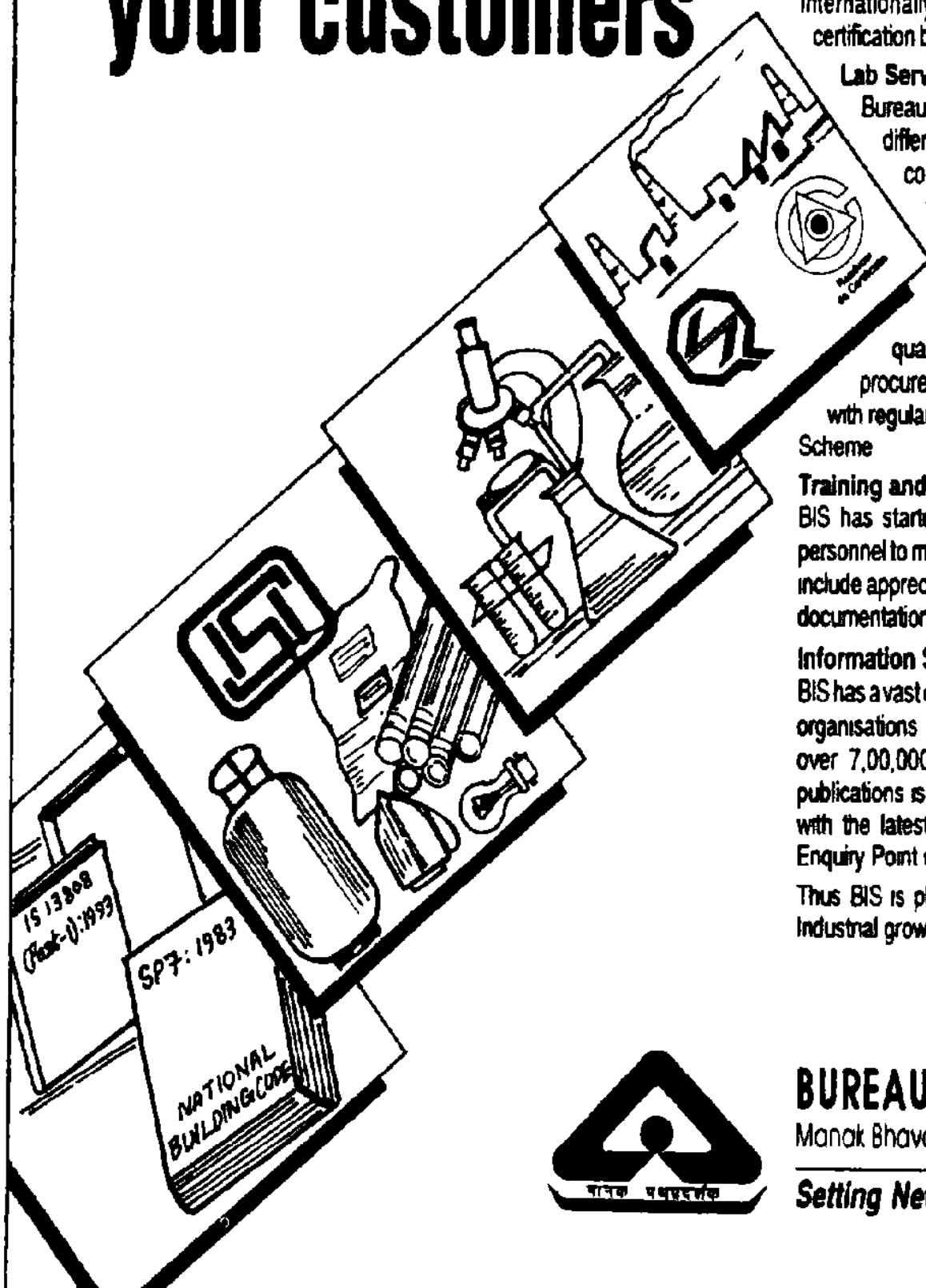
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BOOK REVIEW

Two Experiential Studies

R.P. Singh*

Shanti George. *Third World Professionals and Development Education in Europe.* New Delhi, Sage, India 1997. Pp. 332 Rs. 395/-.

Lalini Varanasi. *Education, Literacy and Experience.* New Delhi, APH Publishing Corporation, 1997. Pp. 120. Rs. 200/-

Third World Professionals & Development Education in Europe is a study of professionals in the third world countries who had the benefit of being exposed to an education and training at the Institute of Social Studies in the Hague, the oldest centre of development studies in Europe. It followed a research design which enabled the researcher to collect 112 life stories of men and women from 18 countries in order to allow her to examine development education in Europe in relation to everyday and professional life in developing countries.

As one could easily guess that all these developing countries had been once colonies for varying periods of time and had been colonized by one or the other European country. In this sense they had a common identity but beyond that they were very different from each other and the fact that they were colonies once prevented them from learning from each other's experience whose relevance though was openly acknowledged. The book raises a few significant questions and attempts to answer some of them. Why should one learn from a "developed" country especially when it is extremely difficult to state what 'development' exactly means. Par-

ticularly interesting is the sub-heading of the book "Personal Narratives Global Conversation". The researcher has toward the end of the book offered her own review of the work undertaken by her. I believe it is the most insightful part of the work.

What came out of the study was the variety of courses the Institute offered and the typology of the mid-career professionals who came here to learn and the manner in which the discontinuity helped them to detachedly gain insights. Apart from the fact that courses were appreciated for diverse reasons ranging from helping the participants acquire methodological and technical skills, sharpened thinking and writing processes to moving beyond disciplinary boundaries and enhanced self-awareness etc, the human environment that extended beyond teacher-pupil relations and the society where one had to live provided an articulation of personal, professional and national identities.

Several other studies like that of Blaney and Inayatullah's have referred to "non-Europe" into a huge canvas of third world identities and recognised wide differences in experience and perception. Therefore what Ashish Nandy calls it a "dialogue of unequals" that takes place between Europe and "non-Europe." This fact also came out rather

prominently that "less developed countries" do not present a stage of development in the process of evolution towards becoming either "modern" or "developed". Under the circumstances there is a possibility of conversation between the two "in the face of differences and in confrontation with power and dominion". Even so the "polylogue" as distinguished from "dialogue" is what lends a meaning to the range of courses being offered and which enables one to think differently as well as have the vicarious experience through knowledge gained from others.

Studying abroad invariably leads to two types of thought processes: one, to perceive differences or similarities in others; and two, to look within. Gandhiji learnt about Hinduism while studying in England and several others gained insights into national political problems while living abroad. Shanti George records both types of experiences. A European reflected: "In a new place, I first see the differences, then the similarities, and then the differences again". The others became aware of their hybrid selves, such as "I have to consider myself a Ghanian, rather than someone from a particular ethnic group"; or, "I am an Indian muslim, and as I grow older, I discover more and more of the Hindu in me". One realizes very clearly that national identity has to be transcended in order to experience internationalism.

One of the things one can really learn from a book like this are the facts: "No country is a model for another", and while, the experience of developing countries are very relevant for each other but they do not seem to want to learn from each other".

Are not these reasons enough

*Former Professor and Dean (Research), NCERT, A-4/206, Kalkaji Extn., New Delhi-110 019.

to make one go elsewhere to learn as well as have experience? I think reading a good book is self-rewarding and there is nothing to look beyond oneself.

Education, Literacy and Experience by Lalini Varanasi is rather a small book in terms of pages (113) but what it purports to examine is not: it has practically overhauled my manner of thinking. It is an attempt to examine the current issues centred round 'literacy', 'experience' and 'pedagogy' and while doing so it has sought to help develop "understanding how knowledges, subjectivities and social practices are produced in the institutions of learning and other cultural spheres is crucial to invent critical literacies and emancipatory pedagogies". For the first time in India we have someone who acknowledges rather openly that "like every definition, defining literacy or experience or schooling are invariably political acts". She goes on to state "the liberal attempts to universalize the above notions have been described as political moves of privileging certain set of practices as natural and necessary." Understanding the relationship between literacy, experience and education requires one to appreciate that one has to include language and power into our framework of understanding. We are told that the recent genre approach to literacy, literacy as a practice approach and the critical literacy approach have opened new debates and possibilities by addressing how the production of truths, values, representations, subjectivities and collective identities take place within specific social, historical, cultural, institutional and textual formations.

We are struck, as we read the book, by the manner in which Lalini Varanasi unravels the centextuality syndrome behind commonly used terms as literacy, education etc. We seldom pause to

ask ourselves what does, for instance, the term "literacy" mean. Is it a goal, or, an instrument for learning or the necessary foundation for a higher quality of life? Depending upon one's class and political leanings the term "literacy" could be made to yield an appropriate meaning. Even organizations like the UNESCO, UNDP and World Bank do not specify that by literacy statistics, they are in fact using a key proxy measure of a nation's social and economic development and progress. There are scholars who frankly say that these definitions are situation-specific and are not absolutely objective. Different cultural groups have different modes of living, styles of learning and specific needs and demands. Therefore no universal definition of literacy is either possible or perhaps necessary.

We learn that most of man's world outlook is shaped by his practical experiences of daily life rather than the set of techniques learnt. Gandhiji understood it all, therefore he asked while a peasant understood and observed rules of morality what was literacy likely to give him?. Gandhiji wanted to know by literacy "will you add an inch to his happiness? Do you wish to make him discontented with his cottage or his lot?" Without reconstructing the contexts of reading and writing we cannot have the answers" how, when, where, why and to whom the literacy was transmitted." The literacy planning must therefore address these questions first.

The 'literacy myth' has been created deliberately by an interested group which says the social mobility, economic prosperity, individual advancement and national development are possible only by acquiring basic skills of reading and writing — but the real reason lie in having social stability and appropriate control and hegemonic functions. Paulo Freire

(1982) had declared learning is to just subvert the native cultures and suppress human potentialities in order to dominate and rule. In other words, literacy (education) is an instrument of political will; the other meanings are there to dilute the impact of the hidden agenda. Therefore Freire thought "literacy must bring political awareness, make people action oriented and pave a way to political and cultural action for freedom". Literacy in its varied reasons can be taken up as both the politics of representation and the representation of politics.

Varanasi explains experience merely as an acquaintance with reality and not the reality itself. After going through various philosophies and philosophers' viewpoints she declares: "the main business or aim of philosophy is to analyze and understand experience and also to reveal that experience does not imply any *a priori* categories and consciousness as an entity rather than a stream." She seems to suggest that Kilpatrick alone was nearer the truth and not the rationalists or the empiricists.

The function of education is clearly charted out by her. Considering that there has been a revolution in political ideas and the principles that govern our societies are rooted in democracy and socialism, today's scholars have rightly rejected old and traditional methods of teaching. Instead, they now provide "varieties of learning experiences and other educational opportunities for students keeping the maximum responsibility on its shoulders to move towards future learning and teaching and for the establishment of tomorrow's school."

What appealed me the most are not her tenets of discussion but the non-conventional approach to look forward to a future which is as challenging as it is uncertain.

COMMUNICATION

The Absent Students

I have gone through 'The Absent Students' by J.N. Kapur in *The University News* No. 52 of December 29, 1997.

Among other suggestions, Kapur has shown a way out of The Absent Students stressing internal gradation system by the teachers teaching the students. I do not know whether as a VC Kapur successfully experimented this system in the affiliated colleges. I do remember that Saurashtra University had experimented 80+20% of internal marking system. It was a failure only because the teachers were generous! or say they had to be generous before the headstrong students. Gujarat Univer-

sity has still 70+30% of internal marking and there also I think the system has never brought the desired results as stated by Kapur. This is only possible where the college is totally autonomous and the teachers are recruited on the basis of their aptitude test having the loving propensity for the teaching profession.

There is a cry of falling standards right from the primary to higher education from all quarters of our society but no one in the UGC, nor NCERT nor NCTE has evolved a system to recruit teachers on the basis of psychological tests!! In many other fields like management, this is stressed but

our educators have failed to implement this system of recruiting teachers which is foolproof system free from corruption in recruiting teachers at all levels. But the system is peopled with "Those who failed elsewhere, were chosen and absorbed for making them Teachers! Though there are exceptional teachers and educational administrators but has their worth been properly valued is the moot question! This is the reason why, I think, the whole system has lost faith of the masses from bottom to top by choosing wrong persons in this holy profession!

Arvind P. Dave
6, Lake View Plot,
Maharshi Dayanand Marg,
Dhrangadhra-363 310 Gujarat.



राष्ट्रीय अध्यापक शिक्षा परिषद् National Council for Teacher Education

15, I.P. Estate, Mahatma Gandhi Marg, New Delhi-110 002

FOR ATTENTION OF STUDENTS DESIROUS OF JOINING B.Ed. AND OTHER TEACHER TRAINING COURSES

Some advertisements have been appearing in various newspapers inviting applications for admission to B.Ed. courses of various universities/institutions. Most of the advertisements are given by some unscrupulous elements/coaching institutions. Certain unrecognised institutions have also been advertising in newspapers inviting students to take admission in their so-called teacher training programmes through face to face teaching method or correspondence mode.

It is hereby informed that with the establishment of the National Council for Teacher Education (NCTE) under an Act of Parliament, all teacher education institutions offering courses for preparation of teachers up to the senior secondary stage of schools are required to obtain recognition from the respective Regional Committee Office of this Council. Qualifications in teacher education obtained pursuant to a course or training offered by any institution which fails or neglects to obtain recognition from the NCTE are not valid for purposes of employment under the Central Govt., any State Govt. or university or in any school, college or other educational body aided by the Central Govt. or any State Govt. It is further informed that teacher training through correspondence/distance education mode offered by some universities is meant only for teachers who are already in a regular service in recognised schools.

Persons desirous of undergoing teacher training programmes are advised to satisfy themselves that the institution offering any such programme has been recognised by the NCTE or has applied to NCTE for recognition. Information in this regard can be obtained from the respective Regional Directors of the NCTE whose addresses are given below :

1. The Regional Director
Eastern Regional Committee (NCTE)
N-2-82, IRC Village,
Nayapalli, Bhubaneswar-751 015 Ph. : 0674-3384654
2. The Regional Director
Western Regional Committee (NCTE)
Manas Bhawan, Shyamala Hills
Bhopal-462 002. Ph. : 0755-630912
3. The Regional Director
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A-46, Shanti Path, Tilak Nagar,
Jaipur-302 004 Ph. : 0141-620 116/823501
4. The Regional Director
Southern Regional Committee (NCTE)
66, 6th Main, 4th Block,
Rajaji Nagar, Bangalore-560 010 Ph. : 080-3306590

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Andhra Pradesh, Karnataka, Kerala,
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Pondicherry.

Member Secretary

davp 1263(12)97



Advt. No. 2/98

Positions are available in a research project on the sense of smell in *Drosophila* supported by grants from World Health Organisation (Geneva) and Department of Biotechnology (Delhi) to Prof. O. Siddiqi. The WHO project is a collaborative venture with Prof. M. Ashburner, Genetics Department, Cambridge University.

The aim of the project is to understand the molecular biology of olfactory reception and the representation of odours in the brain of *Drosophila*. It is an interdisciplinary endeavour combining 1. Analysis of genes that affect olfactory responses; 2. Investigation of electrophysiological and neural correlates of olfactory behaviour; 3. Study of olfactory conditioning, learning and memory.

Positions :

1. **Post Doctoral Associates** : Applicants should have a Ph.D degree. Experience in molecular biology, cell biology or electrophysiology and a strong interest in behavioural genetics will be considered added qualifications. (Salary : 5500/- + HRA 1000/- p.m.)
2. **Research Fellows** : M.Sc. degree in any area of science, Physics, Chemistry, Biology or Electrical Engineering. A good allround academic record; strong interest in basic research in genetic neurobiology. (Salary : 3700/- p.m.)
3. **Junior Research Fellows** : B.Sc. degree in science or Engineering. Outstanding academic record and aptitude for basic research in biology. (Salary : 2500/- p.m.).

Research Fellows may be able to register for Ph.D. or M.Sc. if they qualify in the N.C.B.S. selection interviews.

Fellowships are tenable for 2-3 years. The Post-doctoral fellowships provide an excellent opportunity to young college or University teachers who can obtain leave of absence from their institutions to pursue research.

How to apply :

Write to Prof. O. Siddiqi, N.C.B.S., T.I.F.R. Centre, IISc. Campus, Bangalore 560 012. Please give full biodata and academic record and enclose at least two supporting letters from referees who can testify to your abilities.

Last date for application is **30th March 1998**. Short listed candidates will be asked to come to Bangalore for interview.

THESES OF THE MONTH

A list of doctoral theses accepted by Indian Universities

SOCIAL SCIENCES

Psychology

1. Mishra, Anil Kumar. A study of work of culture among constituent and minority college teachers in Bihar. Department of Psychology, Veer Kunwar Singh University, Ara.

2. Pushp Lata. Value orientations of working women in relation to their family background and personality. Department of Psychology, Veer Kunwar Singh University, Ara.

Sociology

1. Gangopadhyay, Bhaswah. Determinants of birth interval; A case study of Delhi Union Territory, 1984-1992. (Prof M K Premi), Centre for the Study of Regional Development, Jawaharlal Nehru University, New Delhi.

2. Gordhan Ram. Politics, development and modernization among the Bhils of Rajasthan. (Prof J S Gandhi), Centre for the Study of Social Systems, Jawaharlal Nehru University, New Delhi.

3. Itoo, Gh Nabi. Social development of women and children in Jammu & Kashmir: A sociological study of policies and processes in district Anantnag. (Prof Yogendra Singh), Centre for the Study of Social Systems, Jawaharlal Nehru University, New Delhi.

4. Kubendran, C. A study of perception of high risk behaviour and HIV transmission among slum population in Madurai City, Tamil Nadu. (Prof Prabha Ramalingaswamy), Centre of Social Medicine and Community Health, Jawaharlal Nehru University, New Delhi.

5. Malviya, Rameshchandra. Anusoochit jati kalyan karyakram ke prabhav : Ujjain jile ke vishesh sandarbh mein. (Dr V S Saxena), Department of Sociology, Vikram University, Ujjain.

6. Padma Ranu. Occupational patterns and family roles: A sociological study. (Prof C N Venugopal), Centre for the Study of Social Systems, Jawaharlal Nehru University, New Delhi.

7. Shah, Rajshri. Ratlam jile ke grameen parivaron ke sanrachana mein parivartan : Ek samajshastriya adhyayan. (Dr C S Dabhade), Department of Sociology, Vikram University, Ujjain.

8. Shekhar, Indu. Power elite: Structure, ideology and change, a sociological study of a village in Madhipura District. (Prof K L Sharma), Centre for the Study of Social Systems, Jawaharlal Nehru University, New Delhi.

9. Shrivastava, Mamta. Audyogikaran ka janjatiya jeewan per prabhav : Satna jile ke Koul janjati ke vishesh sandarbh mein kewal grameen kahetra per adharit ek samajshastriya adhyayan. (Dr C S Dabhade), Department of Sociology, Vikram University, Ujjain.

10. Venkata Ramana, G. A study of differential fertility and family planning. (Prof G Lakshmaiah Naidu), Department of Sociology, Sri Krishnadevaraya University, Anantapur.

Political Science

1. Acharya, Ila. Swami Vivekanand ka rajnitik chintan va uski prasangikata. (Dr G K Sharma), Department of Political Science, Vikram University, Ujjain.

2. Al-Mahabashi, Essam Ahmad. The United Nations and Palestinian struggle for freedom: A study of the emergence of a State. (Prof M G Gandhi), Department of Political Science, Maharshi Dayanand University, Rohtak.

3. Bava, Ummu Salma. United Germany, European Union and changing pattern of European security. (Prof H S Chopra), Centre for American and West European Studies, Jawaharlal Nehru University, New Delhi.

4. Gurung, Chanda. India, United Nations and the elimination of discrimination against women. (Prof K P Saksena and Dr C S R Murthy), Centre for International Politics, Organization and Disarmament, Jawaharlal Nehru University, New Delhi.

5. Joseph, Benny. Politics and implementation of development programmes in Kerala: A study of the literacy programme in Ernakulam and Palakkad districts. (Dr Sudha Pai), Centre for Political Studies, Jawaharlal Nehru University, New Delhi.

6. Karna, Gajendra Narayan. United Nations, India and the rights of disabled persons. (Prof K P Saksena), Centre for International Politics, Organisation and Disarmament, Jawaharlal Nehru University, New Delhi.

7. Man, Anshu. Indo-Soviet joint ventures. (Prof Devendra Kaushik), Centre for Soviet and East European Studies, Jawaharlal Nehru University, New Delhi.

8. Mathew, Joseph C. Ethnic conflict in Bhutan: Political and economic dimensions. (Prof S D Muni), Centre for South, Central, South East Asian and South West Pacific Studies, Jawaharlal Nehru University, New Delhi.

9. Mukherjee, Pampa. Environmental crisis, protests and the role of local level institutions: A comparative study of forest areas of Almora and Midnapore districts. (Prof Kuldeep Mathur), Centre for Political Science, Jawaharlal Nehru University, New Delhi.

10. Pattanaik, Smruti Smrita. Migration and ethnic politics in South Asia with reference to Nepal and Bhutan. (Dr Nancy Jetly), Centre for South, Central, South East Asian and South West Pacific Studies, Jawaharlal Nehru University, New Delhi.

11. Prabhat Ranjan. Structure versus human agency: A methodological debate in social theory. (Dr Rajeev Bhargava), Centre for Political Science, Jawaharlal Nehru University, New Delhi.

12. Shiva Kumar, G N. Soviet policy towards crisis in East Europe: A comparative study of Czechoslovakia, 1968 and Poland 1981-1984. (Prof Shashu Kant Jha), Centre for Russian, Central Asian and East European Studies, Jawaharlal Nehru University, New Delhi.

13. Tiwari, Sadhana. Bharat Pakistan sambandh; Rajiv Benajir yug : Ek vishleshanatmak adhyayan. (Dr P C Shrivastava), Department of Political Science, Devi Ahilya Vishwavidyalaya, Indore.

14. Usha, K B. Soviet policy towards Communist Movement in Afghanistan, 1965-89. (Dr Tuls Ram), Centre for Soviet and East European Studies, Jawaharlal Nehru University, New Delhi.

Economics

1. Anandaraj, R. Indian industrial growth: Anatomy of the planning regime. (Dr K Pushpangadan), Centre for the Study of

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- High academic standard
- Courses and lectures held in English, at least at the outset
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- International degrees
- German language courses offered before and during the programme
- Special services: academic support services provided by tutors and mentors, intensive study counselling, work in small groups, etc.
- Opportunities for study periods at partner universities and colleges abroad
- No tuition fees

Assured Quality

The DAAD is the body responsible for informing foreign students of the opportunities in offer for study in Germany. Its stringent selection procedure ensures that all the courses publicised by it are of the highest quality and value to visiting students.

Further Information

The following list provides an initial summary of the selected degree programmes. Further information on the admission conditions and requirements, application deadlines and formalities is available directly from the specified contact address at the respective higher education institution. The individual higher education institutions are themselves responsible for deciding on the acceptance and admission of applicants.

None of the listed degree programmes charge tuition fees.

General information on the German higher education system and on aspects related to foreigners studying in the Federal Republic of Germany can be requested by potential applicants from the DAAD, which will be pleased to forward this information.

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e-mail: studying_in_germany@daad.de, Internet: <http://www.daad.de>

The following is a list of selected postgraduate degree programmes in English and German.

Technische Hochschule Aachen
Metallurgy and Materials Engineering

Dipl.-Ing. Götz Heßling
Institut für Eisenhüttenkunde
Inzestrasse 1
D-52072 Aachen
Tel +49 (0)241 80-5783
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Internet <http://www.rwth-aachen.de/MuW>

Degrees

Master of Science in Metallurgy and Materials Engineering

Study focus

- Applications-orientated essentials as well as applied technologies in metallurgy and materials engineering
- Thermochemistry, materials science, process control engineering, high-temperature engineering, metallic materials, non-metallic materials, materials processing, metallurgy and recycling
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Master of Science

Study focus

- Essentials of systems design and technology, micro-electronics, principles of communication, advanced communications, technical management, automation engineering, power electronics systems, robotics
- Industrial practical training period

Friedrich-Alexander-Universität Erlangen-Nürnberg

Computational Engineering

Professor Dr. H.-P. Seidel
Institut für Mathematische Maschinen und Datenverarbeitung (IMMD)
Computer Graphics Group
Am Weichselgarten 9
D-91058 Erlangen
Tel +49 (0)9131 859-919
Fax +49 (0)9131 859-931
e-mail seidel@informatik.uni-erlangen.de
Internet <http://www3.informatik.uni-erlangen.de/1200/staff/graham/masters/index.html>

Degrees

- Master's degree
- Doctorate

Study focus

Architecture and programming of distributed and parallel systems, computer graphics and visualisation, mathematical modelling and data modelling, computational engineering applications science applications

Technische Universität Dresden
German Studies, Culture and Communication

Professor Dr. Walter Schmitz
Mommensenstr. 13
D-01069 Dresden
Tel +49 (0)351-463-4833
Fax +49 (0)351-463-7291

Freie Universität Berlin

Bilingual Programme in Chemistry/Biochemistry

Professor Dr. H. H. Limbach
Fachbereich Chemie
Takusstrasse 3
D-14195 Berlin
Tel +49 (0)30 838-5375
Fax +49 (0)30 838-5310
e-mail selim@chemie.fu-berlin.de
Internet >research.html"/>>courses.html"/>>studies.html

Degrees

Master of Science, German Diplom in Chemistry, doctorate (German PhD)

Study focus

- Physical and theoretical chemistry (20 credit points) organic chemistry (20 credit points), inorganic chemistry (20 credit points) biochemistry (10 credit points)
- Students can choose electives from all areas of chemistry biochemistry and languages (50 credit points)

Technische Hochschule Darmstadt
Civil Engineering

Dekan des Fachbereichs Bauingenieurwesen
Professor Dr.-Ing. R. Katzenbach
Institut für Geotechnik
Petersenstr. 13
D-64287 Darmstadt
Tel +49 (0)6151 163737
Fax +49 (0)6151 166021
e-mail sekretariat@geotechnik.th-darmstadt.de

Degrees

Diplom degree, Master's degree extension possible for a doctorate

Study focus

The following subjects can be taken with varying course credit ratings: Construction management, geoengineering, computer science in civil engineering, concrete structures, steel and timber structures, structural engineering, transport engineering, hydraulic and water resources engineering, water supply engineering, waste water engineering, solid waste engineering, environmental engineering

Universität-GH Duisburg
Information Technology and Communications Engineering

Professor Dr.-Ing. Axel Hunger
Fachgebiet Datenverarbeitung
im Fachbereich Elektrotechnik
Bismarckstr. 81
D-47057 Duisburg
Tel +49 (0)203 379-4211
Fax +49 (0)203 370-439
e-mail hunger@uni-duisburg.de
Internet <http://www.uni-duisburg.de/FB9>

Degrees

Diplom-Ingenieur or Master of Science

Study focus

- Electrical engineering, information technology, technical computing
- In-depth study orientations: Data processing and information engineering (information processing, data storage, data processing, software engineering, computer systems), communications engineering (information transfer and transmission techniques, coding, networks, devices, systems) and technical electronics (technologies and components for information technology and communications engineering)

Humboldt-Universität zu Berlin
International Agricultural Sciences

Professor Dr. Harald von Witzke
FG Internationaler Agrarhandel und Entwicklung
Luisenstr. 56
D-10099 Berlin
Tel +49 (0)30 2093-6233
Fax +49 (0)30 2093-6301

e-mail iags@rz.hu-berlin.de

Internet <http://www.agrar.hu-berlin.de/iags>

Degrees

Master of Science

Study focus

- International agriculture (economics, management, natural resources and the environment, animal sciences, plant sciences)
- Horticulture
- Fisheries studies and aquaculture

Technische Universität Dresden
Computational Logic

Professor Dr. Steffen Hölldobler
Wissensverarbeitung, Informatik
D-01062 Dresden

Tel +49 (0)351 463-8428

Fax +49 (0)351 463-8342

e-mail sh@inf.tu-dresden.de

Internet <http://pikas.inf.tu-dresden.de/computlog/>

Degrees

- Diplom in Computer Science

- Master of Science in Computational Logic

Study focus

Mathematical logic, deduction systems, logic programming, formal software development methods, formal hardware design methods, semantics and logical principles of programming languages, deductive data bases, logical principles of cognitive systems, formal methods in mechanics, logical principles and semantic construction of speech processing, mechatronics and formal methods, production systems and robotics

Friedrich-Alexander-Universität Erlangen Nürnberg
Chemical Engineering

Dr. Ralf Metzler
Lehrstuhl für Strömungsmechanik
Cauersstr. 4
D-91058 Erlangen
Tel +49 (0)9131 859-506
Fax +49 (0)9131 859-503
e-mail rmetzler@lstm.uni-erlangen.de
Internet <http://www.lstm.uni-erlangen.de/inter/int.html>

Degrees

- Master's or Diplom degree
- Doctorate

Study focus

Reaction engineering, separation engineering, mechanical process engineering, apparatus engineering and chemical machine engineering, flow mechanics, technical thermodynamics, environmental process engineering and recycling

Universität Leipzig
International Physics Studies Programme

Professor Dr. Wolfgang Grill
Institut für experimentelle Physik II
Linnestr. 5

e-mail: wschmitz@rcs.urz.tu-dresden.de

Degrees

Master of Arts, doctorate (German PhD)

Study focus

Contemporary German literature, German as a foreign language, applied linguistics, business communication

- Practical training period in industry or cultural organizations

Universität Kaiserslautern

International Mathematics

Dr. Burkhard Strehl

Fachbereich Mathematik

Postfach 30 49

D-67653 Kaiserslautern

Tel. +49 (0)631 205-2254

Fax +49 (0)631 205-3052

e-mail: mathint@mathematik.uni-kl.de

Internet: <http://www.mathematik.uni-kl.de/mathint/>

Degrees

Master of Science, Master of Technology

Study focus

In-depth study orientations: Algebraic geometry and computer algebra, financial mathematics, functional analysis and probability, industrial mathematics, modelling and scientific computing, optimisation and statistics

Technische Universität Hamburg-Harburg

Materials Science/Mechatronics/

Process Engineering/Information and

Communications Systems/

Structural Engineering

Professor Dr. W. Bauhofer

Arbeitsbereich Materialien

der Mikroelektronik

Martin-Leuschel-Ring 16

D-21073 Hamburg

Tel. +49 (0)40 7718-3047

Fax +49 (0)40 7718-2229

e-mail: bauhofer@tu-harburg.d400.de

Internet: <http://www.tu-harburg.de>

Degrees

- Master of Science or Diplom-Ingenieur degree

- Opportunity for a doctorate

Study focus

Materials Science Specialist training in the technology of conventional and modern materials, such as metals, intermetallics, polymers, ceramics and glass

Mechatronics Specialist training in the interdisciplinary field, combining mechanics, electronics, computer science, metrology and sensor engineering

Process Engineering Provides opportunities for incorporating modern techniques essential to future production processes, such as biotechnology, environmental engineering, such as biotechnology, environmental engineering and modern power engineering into the fundamental expertise of physical and chemical processing

Information and Communications Systems

Specialist training in the design and implementation of networking infrastructures and the applications which run on them

Structural Engineering

- Programme under development

- Non-technical courses: International business, international law

- Industrial practical training period: Integrated specialist practical training

Georg-August-Universität Göttingen

International Mathematics

Professor S. J. Patterson

Mathematische Fakultät

Bunsenstr. 3-5

D-37073 Göttingen

Tel. +49 (0)551 39-7768

Fax +49 (0)551 39-2985

e-mail: sjp@uni-math.gwdg.de

Internet: <http://www.uni-goettingen.de>

Degrees

- Master in Mathematics

- Doctorate

Study focus

Pure mathematics, applied mathematics, theoretical computer science

Universität Karlsruhe

Electrical Engineering

Akademisches Auslandsamt

Karlstr. 42/44

D-76133 Karlsruhe

Tel. +49 (0)721 608-4911

Fax +49 (0)721 608-4918

e-mail: pc01@rz.uni-karlsruhe.de

Internet: <http://www.uni-karlsruhe.de>

Degrees

Diplom-Ingenieur (Master of Electrical Engineering)

Study focus

- In-depth study orientations: Theory of electrical engineering, information technology, bio-medical engineering, materials in electrical engineering, control systems, electrical drives and power electronics, electrical power systems and high-voltage technology, electrooptics, RF technology, optical communication technology, information processing technologies in sound and image processing

- 8-week industrial practical training (arranged by the Faculty)

Universität Magdeburg

Economics and Management

Frau Dipl.-Phil. Sylvia Nagel

FWW

Postfach 41 20

D-39106 Magdeburg

Tel. +49 (0)391 67 18 740

Fax +49 (0)391 67 11 136

e-mail: nagel@ww.uni-magdeburg.de

Internet: <http://www.uni-magdeburg.de>

Degrees

- Master of Arts in Economics, Master of Arts in Management

- Doctorate

Study focus

- Management programme: General Management (business administration), economics

- Specialisation available in: Production and operations management, marketing, banking and finance, strategic management and organisation, management accounting, financial accounting, auditing and taxation, Operations Research, international management

- Economics programme: Economic theory, political economy, international or public economics, general or international management

D-04103 Leipzig

Tel. +49 (0)341 9732-681

Fax +49 (0)341 9732-699

e-mail: mtphys@server.rz.uni-leipzig.de

Internet: <http://www.uni-leipzig.de/~mtphys/>

Degrees

- Master of Science (MSc)

- Doctorate (Dr. rer. nat. or Dr. phil.)

Study focus

- Essential elements: Theoretical, basic and applied physics, mathematics, computer science, and chemistry

- Special programmes: materials science, optoelectronics, high-resolution microscopy, polymer science, physical chemistry, applied mathematics, industry-related research and development, signal and data processing, biophysics, and medical applications

Universität Stuttgart

Water Resources Engineering and Management

Jürgen Braun, PhD

WAREM

Water Resources Engineering and Management

Institut für Wasserbau

Pfaffenwaldring 61

D-70550 Stuttgart

Tel. +49 (0)711 685-4601

Fax +49 (0)711 685-7020

e-mail: warem@iws.uni-stuttgart.de

Internet: <http://www.uni-stuttgart.de>

Degrees

Master of Science

Study focus

Hydrocomputing and hydrosystems, ground water resources management and subsurface remediation, ecohydraulics and hydraulic engineering, water quality management, urban hydraulics and sanitary engineering, integrated water resources management

Universität-GH Kassel

Electrical Engineering/

Communications Engineering

Professor Dr.-Ing. Günter Kompa

Fachgebiet Hochfrequenztechnik

im Fachbereich Elektrotechnik

Wilhelmshöher Allee 73

D-34121 Kassel

Tel. +49 (0)561 804-6364

Fax +49 (0)561 804-6529

e-mail: kompa@hfm.e-technik.uni-kassel.de

Internet: <http://www.uni-kassel.de>

Degrees

-Diplom-Ingenieur or Master's degree

- Doctorate

Study focus

High-frequency technology (microwaves and millimetre waves, electronic and optoelectronic devices, MMIC design), electromagnetic theory (fields and waves, advanced solutions for Maxwell's equations, numerical methods, inverse scattering), technical electronics (photonics, semiconductor technology, device modelling), communications systems (theory of communication, digital radio systems and channel modelling, antenna design)

DAAD

German Academic Exchange Service

The following is a list of selected undergraduate degree programmes in English:

Fachhochschule Aachen

International Technology Studies

Professor H. J. Buchkremer (Rector)

Kalverbenden 6

D-52066 Aachen

Tel +49 (0)241 6009-0

Fax +49 (0)241 6009-1090

e-mail buchkremer@fh-aachen.de

Internet http://www.fh-aachen.de

Degrees

Diplom FH degree, or Bachelor of Science, or

Bachelor of Engineering

Study focus

Biomedical engineering, electrical engineering, chemical engineering, mechanical engineering, physical engineering, technomathematics, bioengineering

Friedrich-Alexander-Universität

Erlangen-Nürnberg

Chemical Engineering

Dr. Ralf Metzler

Lehrstuhl für Strömungsmechanik

Cauerstr. 4

D-91058 Erlangen

Tel +49 (0)9131 859-506

Fax +49 (0)9131 859-503

e-mail rmetzler@istm.uni-erlangen.de

Degrees

- Bachelor's degree, plus option of a Master's or

- Diplom degree

Study focus

Reaction engineering, separation engineering, mechanical process engineering, apparatus engineering and chemical machine engineering, flow mechanics, technical thermodynamics, environmental process engineering and recycling

Universität Magdeburg

Economics and Management

Frau Dipl.-Phil. Sylvia Nagel

FWW

Postfach 41 20

D-39106 Magdeburg

Tel +49 (0)391 67 18 740

Fax +49 (0)391 67 11 136

e-mail nagel@ww.uni-magdeburg.de

Internet http://www.uni-magdeburg.de

Degrees

- Bachelor of Arts in Economics

- Bachelor of Arts in Management (followed by a Master's degree programme)

Study focus

- Essential components taught in both the economics and the management programmes: Micro-/macro-economics, management functions, accounting, German Civil Law, quantitative methods, foreign language courses

- Economics programme specialisation options: economic theory, political economy, public economics, international economics

- Management programme specialisation options: strategic management and organisation, financial accounting, auditing and taxation, management accounting, banking and finance, marketing, production and operations management, Operations Research, international management

Universität-Gesamthochschule Duisburg

Information Technology and Communications Engineering

Professor Dr.-Ing. Axel Hunger

Fachgebiet Datenverarbeitung

im Fachbereich Elektrotechnik

D-47048 Duisburg

Tel +49 (0)203 379-4211

Fax +49 (0)203 370-439

e-mail hunger@uni-duisburg.de

Internet http://www.uni-duisburg.de/FB9

Degrees

Diplom-Ingenieur or Master of Science

Study focus

- Electrical engineering, information technology, technical computing

- In-depth study orientations: data processing and information engineering (information processing, data storage, data processing, software engineering, computer systems), communications engineering (information transfer and transmission techniques, coding, networks, devices, systems) and technical electronics (technologies and components for information technology and communications engineering)

Technische Universität Hamburg-Harburg

General Engineering Studies

Professor Dr. W. Bauhofer

Arbeitsbereich Materialien der Mikroelektronik

Martin-Leuschel-Ring 16

D-21073 Hamburg

Tel +49 (0)40 7718-3047

Fax +49 (0)40 7718-2229

e-mail bauhofer@tu-harburg.d400.de

Internet http://www.tu-harburg.de

Degrees

- Bachelor of Science, Master of Science

- opportunity for a doctorate (after completion of the Master of Science degree)

Study focus

- Bachelor's programme: Basic Study Stage, Essentials of engineering

- In-depth study orientations: Materials science, mechatronics, information and communications systems, process engineering

- Range of non-technical courses: For example, industrial management, occupational science, law and public administration, personnel management, environmental science

- Industrial practical training period: 13 weeks of basic practical training (to be completed by the pre-Diplom stage)

Fachhochschule Reutlingen

International Business

Professor Dr. Bernd Banke

Fachbereich Außenwirtschaft

Alteburgstr. 150

D-72762 Reutlingen

Tel +49 (0)7121 271-437 or -424

Fax +49 (0)7121 271-400

e-mail bernd.banke@fh-reutlingen.de

Internet http://www.fh-reutlingen.de/~www-aw

Degrees

- Diplom-Betriebswirt (FH)

- MBA awarded by the partner university in the United States

Study focus

General management, marketing, accounting, finance, economics, law, business computing, business languages

Universität Kaiserslautern

International Mathematics

Dr. Burkhard Strehl

Fachbereich Mathematik

Postfach 30 49

D-67653 Kaiserslautern

Tel +49 (0)631 205-2254

Fax +49 (0)631 205-3052

e-mail mathint@mathematik.uni-kl.de

Internet http://www.mathematik.uni-kl.de

Degrees

Bachelor of Mathematics, plus option of a Master's or Diplom degree

Study focus

Pure and applied mathematics

Universität Leipzig

International Physics Studies

Programme

Professor Dr. Wolfgang Grill

Institut für experimentelle Physik II

Linnéstr. 5

D-04103 Leipzig

Tel +49 (0)341 9732-681

Fax +49 (0)341 9732-699

e-mail intphys@server.rz.uni-leipzig.de

Internet http://www.uni-

leipzig.de/~intphys/

Degrees

- Bachelor of Science (Bsc),

Master of Science (Msc)

- an additional 6 semesters lead to a doctorate (Dr. rer. nat. or Dr. phil.)

Study focus

- Essential elements: Theoretical, basic and applied physics, mathematics, computer science, and chemistry

- Special programmes: Materials science, optoelectronics, high-resolution microscopy, polymer science, physical chemistry, applied mathematics, industry-related research and development, signal and data processing, biophysics, and medical applications

Fachhochschule Stralsund

Baltic Management Studies

Professor Dr. Jürgen Rothlauf

Fachbereich Wirtschaft

Große Parower Str. 145

D-18435 Stralsund

Tel +49 (0)3831 456-581

Fax +49 (0)3831 456-604

e-mail juergen.rothlauf@fh-stralsund.de

Internet http://www.fh-

stralsund.de/eng/Studium/Wi/

bm_grund.html

Degrees

Diplom-Betriebswirt (FH) plus additional degree awarded by the respective foreign partner higher education institution at which the student spends the study period abroad

Study focus

- Management theory, finance, accounting, special business aspects in the Baltic Sea countries

- Practical study semester



BIRLA INSTITUTE OF TECHNOLOGY

MESRA : RANCHI - 835215

(Deemed University)

ADMISSION NOTIFICATION 1998

The Entrance Examination for Admission to

(A) UNDER GRADUATE DEGREE COURSES :

- (1) B. Arch (Bachelor of Architecture - 5 Years) Course.
- (2) B.E. (Bachelor of Engineering - 4 Years) Course in Civil, Computer Science, Electrical and Electronics, Electronics and Communication, Mechanical, Production & Polymer Engineering.
- (3) B Pharm. (Bachelor of Pharmaceutical Sciences - 4 Years) Course.

(B) POST GRADUATE DEGREE COURSES:

- 1) M.B.A. (Master of Business Administration) 2 Yrs Full-Time Course and 3 Yrs Part-Time Course
- 2) M.C.A. (Master of Computer Applications) 3 Yrs Full-Time Course and 4 & 1/2 Yrs Part-Time Course
- 3) M.Sc. (Information Science-M.I.S.) 2 Yrs Full-Time Course
- 4) M.Sc. (Master in Bio-Medical Instrumentation-B.M.I.) 2 Yrs Full-Time Course

(C) POST GRADUATE DIPLOMA COURSE :

P.G.D.C.A. (Diploma in Computer Applications) 1 Yr Full-Time Course and 1 & 1/2 Yrs Part-Time Course Will be held on May 29th and 30th 1998 at the following centres

Agra, Ahmedabad, Allahabad, Bangalore, Bareilly, Bhagalpur, Bhopal, Bhubaneswar, Calcutta, Chandigarh, Chennai, Dehradun, Delhi, Dhanbad, Guwahati, Ghaziabad, Gorakhpur, Hyderabad, Jaipur, Jamshedpur, Lucknow, Mumbai, Muzaffarpur, Nagpur, Patna, Ranchi, Trivandrum, Varanasi and Vijayawada, provided sufficient number of candidates opt for the proposed centres.

ELIGIBILITY FOR UNDER GRADUATE COURSES :

- (1) Bachelor of Architecture 1 Sc/10+2 or equivalent with Physics, Chemistry and Mathematics
- (2) Bachelor of Engineering 1 Sc/10+2 or equivalent with Physics, Chemistry and Mathematics
- (3) Bachelor of Pharmaceutical Sciences 1 Sc/10+2 or equivalent with Physics, Chemistry and Biology The students opting for 5 years Bachelor of Architecture course are required to appear in a Aptitude Test for Architecture in addition to papers in Mathematics, Physics and Chemistry Maximum age limit for admission in undergraduate courses is 21 years as on 1 10 1998 relaxable by 5 years in case of SC/ST candidates

ELIGIBILITY FOR POST GRADUATE COURSES :

- (1) M.B.A. (Master of Business Administration) Full-Time Course 2 years and Part-Time Course 3 years Graduate (10+2+3 system) in any discipline with at least 50% aggregate marks at graduate level For Part-Time students in addition 3 years experience in a reputed firm after graduation is necessary
- (2) M.C.A. (Master of Computer Applications) Full-Time Course 3 years and Part-Time Course 4 & 1/2 years Graduate (10+2+3 system) with Mathematics/Statistics as one of the subjects obtaining atleast 50% aggregate marks at graduate level For Part-Time students in addition 3 years experience in a reputed firm after graduation is necessary
- (3) M.Sc. (Information Science-M.I.S.) Full-Time Course of 2 years Graduate (10+2+3 system) in any discipline with at least 50% aggregate marks at graduate level
- (4) M.Sc. (Master in Bio-Medical Instrumentation-B.M.I.) Two years programme with six months Internship in Hospital B.Sc. (10+2+3 system) with at least 50% aggregate marks at graduate level with Mathematics/Biology as one of the subjects
- (5) P.G.D.C.A. (Diploma in Computer Applications) Full-Time Course 1 year and Part-Time Course 1 & 1/2 years Graduate (10+2+3 system) in any discipline with Mathematics/Statistics in 10+2 level with at least 50% aggregate marks at graduate level For Part-Time students in addition one year experience in a reputed firm after graduation is necessary

Those appearing at the various qualifying examination are also eligible. The selected candidates will however, be required to produce the qualifying examination result by 30th September. Application forms for the above programmes can be obtained by post on non-refundable pre-payment of Rs 150/- (Rupees One Hundred Fifty only) by crossed Indian Postal Order/Bank Draft, in favour of 'BIRLA INSTITUTE OF TECHNOLOGY' payable at Mesra/ Ranchi. The request should accompany a self addressed envelope of size 26x12cm affixed with postage stamps of Rs 6/- (Rupees Six Only) clearly mentioning on the envelope the form required i.e. B. Arch/B.E./B.Pharm./M.B.A./M.C.A./D.C.A./M.Sc. (M.I.S.)/M.Sc. (B.M.I.) as the case may be. The last date for obtaining the forms by post is 31st March 1998. Forms can also be obtained in person against payment by crossed I.P.O./D.D. for Rs 150/- (Rupees One Hundred Fifty only) issued in the name of "BIRLA INSTITUTE OF TECHNOLOGY" Payable at RANCHI from Counters of the Institute at Main Building, B.I.T. Mesra and Counters of B.I.T. Extension Centres in the following cities at addresses given below from 31st January 1998.

ALLAHABAD :

B-7, Industrial Area
Naini, Allahabad or
14, Tagore Town, Allahabad

RANCHI :

B.I.T., Extension Centre
Lalpur, Ranchi-1

CALCUTTA:

BIT Extension Centre,
BF-302, Salt Lake City, Calcutta - 54

JAIPUR:

B.I.T., Extension Centre
BISR Campus, 27, Malviya Industrial
Area, Jaipur-17

NOIDA: DELHI-REGION

A-7, Sector-1
Noida, U.P.

HYDERABAD:

B.I.T. Extension Centre
B.M. Birla Science Centre
Adarsh Nagar, Hyderabad-63

Vendor's Official Seal and Address must be insisted upon in case Form is obtained otherwise.

THE LAST DATE FOR RECEIPT OF COMPLETE APPLICATION FORM IS APRIL 7, 1998.

There is provision of Direct Admission for Non Resident Indian Students whose parents are employed ABROAD and who pay the Educational Cost in U.S. Dollars.

Such N.R.I. students must apply on the prescribed form obtainable from the Institute by sending non refundable Bank Draft of U.S. \$ 50 in favour of BIRLA INSTITUTE OF TECHNOLOGY, RANCHI, INDIA before 15th June, 1998 AND must have passed -

(i) 1 Sc/10+2/XII standard / 'A' level or any other examination which is recognised by the Association of Indian Universities equivalent thereto with Physics, Chemistry and Mathematics/Biology with a minimum of 60% Marks in aggregate for UNDER GRADUATE COURSES,

(ii) Graduate (10+2+3 system) in any discipline or any other Examination which is recognised by A.I.U. equivalent thereto as mentioned above for POST GRADUATE COURSES, from school/colleges abroad

Note - In case of any dispute concerning Entrance Test 1998, the same shall be subject to exclusive jurisdiction of Courts at RANCHI.

B.I.T., Mesra, Ranchi.

Date : Jan. 5th 1998.

(S.P. Bhatnagar)

OSD & Controller of Entrance Examinations

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| International Marketing: Analysis and Strategy, 3rd Ed, Onkvisit & Shaw | 295.00 |
| Introduction to Management Accounting, 10th Ed, Horngren, Sundem & Stratton | 350.00 |
| Management, 6th Ed, Stoner, Freeman & Gilbert, Jr | 295.00 |
| Management in Engineering: Principles and Practice, 2nd Ed, Freeman-Bell & Balkwill | 195.00 |
| Management Information Systems, Sadagopan | 125.00 |
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MANIPAL ACADEMY OF HIGHER EDUCATION

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1998**

University Building, Madhav Nagar, Manipal-576 119

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ADMISSION TO MBBS/BDS AND MD/MS/DM/MCh/PG DIPLOMA/MDS
AT KASTURBA MEDICAL COLLEGE, MANIPAL/MANGALORE,
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MBBS/BDS : General category candidates are admitted on the basis of rank obtained in All India Under Graduate Entrance Test (UGET 98). Foreign/NRI candidates can write to The Director, International Student Affairs at the above address for admission details under foreign/NRI category.

Schedule & Centres for UGET 98 : May 28, 1998 — Bangalore, Calcutta, Chandigarh, Chennai, Delhi, Ernakulam, Hyderabad, Mangalore, Manipal, Nagpur, Thiruchirapalli.

Eligibility : (1) Candidates must be Indian nationals, born on or before July 01, 1981 (2) Candidates must have passed with 50% marks in English and 50% marks in Physics, Chemistry and Biology taken together at Higher Secondary Examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years of study, from an Indian University/Board (3) Candidates must have done at least 5 years of schooling in India including class 11 and 12 out of 12 years from class 1 to class 12.

Candidates who are appearing and expecting to pass the final qualifying examination with requisite percentage of marks can also apply and appear for UGET 98.

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Other candidates — May 10, 1998 at Manipal & Mangalore.

Eligibility : Foreign/NRI Candidates : (a) Candidates must have passed MBBS/BDS or equivalent recognised by Medical/Dental Council of India (b) Candidates must be registered with any State Medical/Dental Council in India (c) Candidates must have completed their compulsory rotatory internship or should be completing it on or before September 01, 1998 to be eligible for August 1998 batch. Candidates completing internship after September 01, 1998 and before January 22, 1999 could be permitted to join the course in January 1999. (d) NRI candidates must be supported by either of Parents, Brother, Sister, Spouse, Spouse's parents or Spouse's Brother/Sister having NRI status.

Other Candidates : (a), (b), & (c) as above (d) Candidates must be Indian Nationals.

DMMCh : Candidates are admitted on the basis of past academic and professional record and a selection test consisting of Departmental Written Test, Clinical Examination and Viva Voce.

Schedule & Centre for Selection Test : July 20 & 21 1998, at Manipal only.

Eligibility : (A) Candidates must be Indian Nationals (B) DM applicants must have passed MD In General Medicine or Paediatrics, MCh applicants MS in General Surgery, recognised by Medical Council of India. (C) Candidates must have a permanent registration with any State Medical Council in India.

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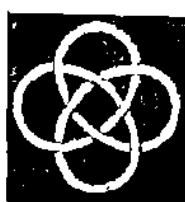
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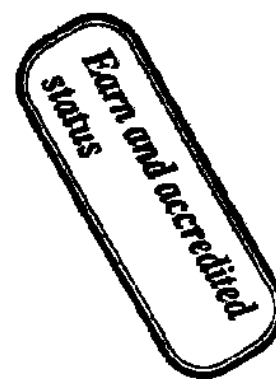
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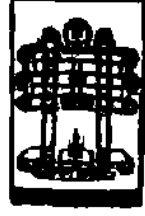
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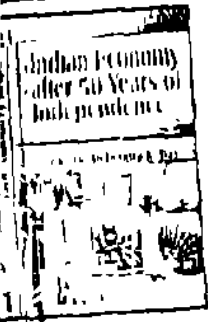


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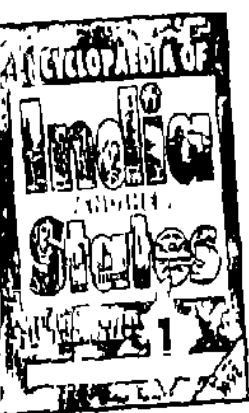


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